NATURE MAGAZINE

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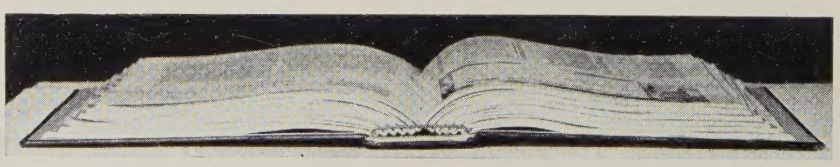

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Edited By
ELEANOR WALKER

Spain

In these days when everything you touch from a hot water bottle to a typewriter has been dipped in a dye bath, sometimes with rather less than more aesthetic sense, it may be interesting to visit or at least to study a country whose name is almost synonymous with color. Spain never suggests pastels or daintiness, but strong colors in large splotches—reds and yellows, vivid greens and orange, strong blues. Undoubtedly affairs there will be quite orderly by fall, and that is when you would want to go.

Perhaps Nature's vivid coloring of the Iberian Peninsula itself has made the race a devotee of strong colors. The brilliance of the sun shining on orange and lemon groves, the deep green of cypresses, the vivid blue of the Mediterranean are appropriately reflected in the gay colors so lavishly embroidered on the Spanish shawl. Sometimes it seems as though they mercilessly embroider their buildings as well as their shawls, as, for example, the façade of the College of San Pablo at Valladolid or the door of the Palace of the Marquis of Dos-aguas at Valencia. The frieze connecting the pillars of the patio of the Infantado Palace at Guadalajara is so intricately carved one cannot but see it as an edging of filet. When we grow weary of what seems to us a bombastic style, we are delighted to find the monastic simplicity of such buildings as the Escorial, just out of Madrid, the exchange at Valencia, the monastery at Monserrat.

Some of the most interesting parts of Spain are fairly hot in the summertime. You do get good weather in the resorts along the Bay of Biscay, such as San Sebastian and Santander; also along the Mediterranean coast and in the mountains. But the best seasons in which to visit Spain as a whole are spring and fall, particularly fall. The one place which attracts crowds during the spring is Seville, for the season then culminates in the fair of the Holy Week, a most colorful pageant. But Seville, with its huge Gothic cathedral, its Giraldilla tower with the famous weathercock statue of Faith, its Alcázar with delicately arched patios, is stimulating enough at any time of the year.

Can you imagine a more charming name for a province than Andalusia? Andalusia suggests far-reaching groves of orange and lemon trees, terraced vineyards, gardens everywhere, hills on the outskirts and a brilliant sun over all. That really is Andalusia in southern Spain. Then, where under a sky of cloudless blue you come upon a city of shining white walls with narrow winding streets climbing here and yon, you may well fancy yourself in a

(Continued on page 3)

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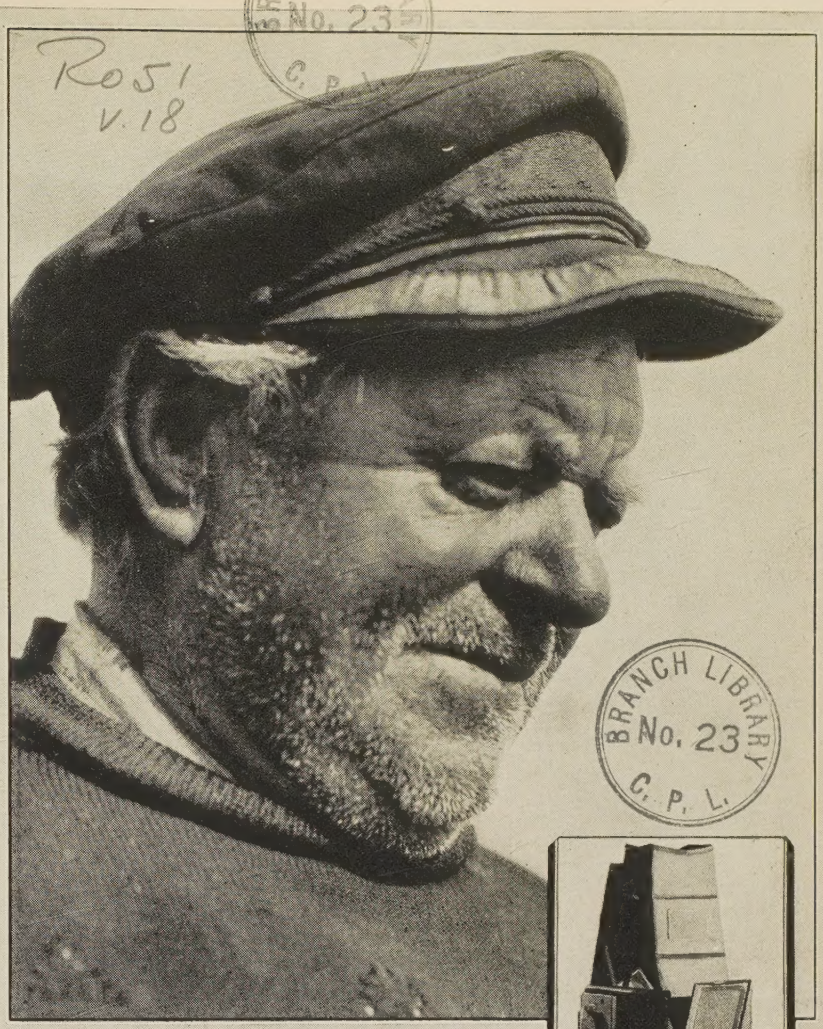

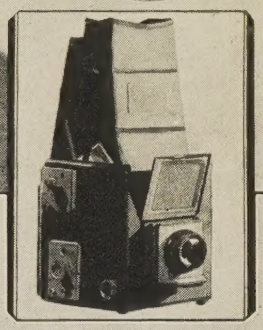

"Barnacle Bill"

There are "picturesque characters" where You are going this summer!

You'll want to take pictures of them—and of hundreds of other subjects—pictures so fine you'll be proud to show them to your friends! . . . Take along a Graflex!

Let the nearest dealer in fine cameras show you the superiorities that make Graflex the Camera for better pictures.

THE above way-down-east photograph—the man who took it calls it "Barnacle Bill"—was taken with a Graflex, the easy-to-operate Camera for superior pictures.

No guesswork about focus or whether Bill's features were in the centre of the picture—the Graflex ground glass showed in advance just when the picture was in perfect focus, and, full picture size, just how natural Bill would look.

EXECUTIVES—*Write for data re: Business Uses of Graflex.*

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SCENES

BIRDS

UNUSUAL

GROUPS

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NATURE

LAST CALL!

Have you entered any pictures in Nature Magazine's $500 Contest? Some amateurs are going to win those decidedly worth-while prizes. Let's see, just what *could* we do with $100—$75—$50? Well, there is almost no end to ideas that pop into our minds.

You may say, "Oh, I can't make the kind of pictures that will be likely to win those prizes." You never can tell; some lucky shot may especially appeal to the judges. Remember that *subject interest* will count most—not technique. Then, too, there are sixty-five more prizes to be captured. Size of picture does not matter—every one entered will be carefully considered on its particular merits.

This contest closes July 31, so there is still time to make many pictures to enter. No limit has been placed upon the number that may be submitted by one person.

The exposure tables below may aid you in getting good pictures. We have grouped the subjects that require a certain setting of camera shutter. When action demands a faster shutter speed or when the day is not very bright, a larger lens opening should be employed. Once you have an idea of the exposure a certain kind of subject needs you will find it easy.

PHOTOGRAPHIC DEPARTMENT

Edited by
ROBERT T. LOWELL

$500.00
FOR SNAPSHOTS!
Like You Can Make

First Prize	$100
Second Prize	75
Third Prize	50
Next 15 Prizes	10
Next 25 Prizes	5
Totaling	$500.00

SPECIAL AWARDS

25—One Year Subscriptions to Nature Magazine—winners having privilege of extending their subscription or of designating someone to whom they wish the magazine to be sent.

CONTEST CLOSES JULY 31!

No limit on number that may be entered. Print name and address on backs of pictures. Send to Nature Magazine, Washington, D. C.

PICTURE MATERIAL

The little pictures used as a border around this page suggest various subjects and occasions for interesting snapshots. They are but suggestions of a great variety that are available to anyone. All were made by amateurs like yourself and many were taken with simple, inexpensive cameras. While there are chances galore on vacation, on hikes through the woods and when traveling, there is also an abundance of material right around home.

There are Nature subjects in our gardens, in the parks and out on the farm. To make close-ups of small objects or to make head and shoulder portrait studies, secure what is known as a Portrait Attachment which merely slips over the regular camera lens.

From the right angle you may get an especially attractive picture of the house or doorway. Then, too, by making a "time" exposure you can make pictures of the rooms, or of some favorite nook or corner. The pets—canary, cat or dog—can be used as subjects. Again, there is dad or mother admiring the blooms of the flower-bed, sister using the hose or junior shoving the lawnmower. Children at play are always good picture subjects—catch them when they are not looking at the camera.

CHILDREN

PETS

MARINE

TRAVEL

PASTIMES

FLOWERS

FOREIGN

EXPOSURE TABLE FOR FOLDING CAMERAS

—For 2 hours after sunrise until 2 hours before sunset—

—With Graflex cameras use the 1/75 second shutter speed for ordinary subjects—

	Shutter Speed	Double Lens Stops F.	Double Lens Stops U. S.	Single Lens Stops No.
Snow, Marine and Beach Scenes—Extremely Distant Landscapes	1/25	22	32	3
Ordinary Landscapes Showing Sky, Principal Object in Foreground; Light Colored Buildings	1/25	16	16	2
Nearby Landscapes, Groups, Street Scenes, Dark-toned Buildings	1/25	11	8	1
Portraits in Bright Shade, not *Under* Trees—Shaded Nearby Scenes	1/25	8	4	*

**Give about 1 second with stop 3 for best results. In very bright shade where there is much reflected light, use 1/25 at stop No. 1*

EXPOSURE TABLE FOR FIXED FOCUS BOX CAMERAS

—For 2 hours after sunrise until 2 hours before sunset—

Snow, Marine and Beach Scenes—Extremely Distant Landscapes	Snapshot—with Second Stop
Ordinary Landscapes Showing Sky, Principal Object in Foreground; Buildings	Snapshot—with Largest Stop
Nearby Landscapes Showing Little Sky—Groups, Street Scenes, no Heavy Shade	Snapshot—with Largest Stop
Portraits in Open Shade, not *Under* Trees or Porch—Shaded Nearby Scenes	1 Second with Third Stop

An old rule is "Expose for the shadows and the highlights will take care of themselves." This is still excellent advice, especially when taking nearby objects where we are after shadow detail.

GARDENS

SEASCAPES

STORY-TELLING

WILD ANIMALS

VACATION

TRAVEL DEPARTMENT

(Continued from page 1)

dream. Córdoba was long the capital of the Western Caliphate and you still find traces of the Moor everywhere. The mosque of Córdoba is almost as thrilling an experience as the chapel of Sainte-Chapelle in Paris. You are lost in a forest of marble columns, all connected by Moorish arches. The varied color of the marble here is revealed by a stray shaft of light, there lost in deep shadow. You have a feeling of profound mysticism, unforgettable. Córdoba is full of famous churches, museums and palaces, but be sure to leave time for motoring over the Sierra of Córdoba—a most charming excursion into the mountains.

You've read about Granada and the Moorish palace of the Alhambra all your life; so we merely wish to mention the gorgeous view of the Sierra that you see from the Alhambra hilltop. Autumn is the best season to come here.

By this time it may seem to you that every Spanish town is built upon a hill, and that every hilltop or side is made picturesque by the spires of a cathedral or the towers of an Alcázar, or the turreted walls of a palace. But can you think of a country from which you carry away so many beautiful hilltop memories?—the Alhambra in Granada, the Basílica of Covadinga, the towers of Segovia, the overhanging houses of Cuenca, the Pilar Temple at Zaragoza, and above all, the monastery at Monserrat; those simple buildings so effectively placed at the foot of mountain crags!

Toledo is another city set hazardously upon a hill. No matter what kind of a day you have when you visit Toledo, you'll probably think of it in terms of El Greco's paintings, vivid purples and grays. El Greco's house and garden are here, a Gothic cathedral, the Alcázar built by Charles V, and many churches and museums.

Of course, you'll go to Madrid and the Escorial, but while you're in that section try to include the university town of Salamanca, the hilltop town of Segovia, colorful Valladolid and Zaragoza with its Pilar Temple. Then, indeed, it might be well to rest oneself either in San Sebastian, the summer resort of royalty on the Bay of Biscay, or in Valencia on the Mediterranean Coast. Valencia seems more alluring because as you go through the province of that name, you go through a lovely countryside. Plants and flowers abound. Orange groves are everywhere, and here and there you will see that most charming house of the Spanish peasant, the white-washed barraca, thatch-roofed with rice straw and often vine-covered. The well, also white-washed and hooded, stands in front. Within the barraca you may see a spotless home, with a fireplace, huge beams hung with green and yellow melons, or red Indian corn, and simple, sturdy furniture.

Valencia itself is delightful. It lies in a wide plain and in its midst rises the imposing tower of the cathedral, El Miguelete, surrounded by a multitude of belfries. Valencia would scarcely be a Spanish city without its convents, churches, museums and palaces. It also has a university.

Then could you end your trip by going to that most charming of the Balearic Isles, Mallorca, happy would be your luck.

IN THE DARK FOREST A PICTURE WAITS

catch it with this
NEW INVENTION•

• WHEN the belated fishermen triumphantly return to camp after dark—will you get that prize-winning picture? You will, if you use this new invention that keeps your camera alert 24 hours of the day—in rain, or darkness, inside or out—for the pictures you wish to keep.

The new MAZDA Photoflash Lamp operates noiselessly and instantaneously, without smoke, odor, or dust. A brief, brilliant flash of light, which catches normal action, and the picture is yours.

Be smart. Take a dozen or more MAZDA Photoflash Lamps with you on your vacation and get unusual pictures that you and your companions will always treasure. For best results, use the lamp in one of the handy reflectors, which come complete with flashlight batteries for igniting the lamp, and which are now obtainable where you buy film, for a very low price.

When buying Photoflash Lamps, be sure they bear the G. E. in a circle and the words "Photoflash Lamp" on the disc within the bulb.

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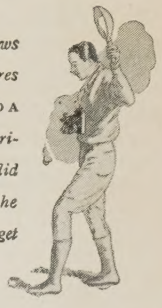


This sketch shows how to take pictures with MAZDA *Photoflash. A tripod or other solid support for the camera helps get better pictures.*

MAZDA PHOTOFLASH LAMPS

Manufactured by

GENERAL ELECTRIC

and sold by its Edison Lamp Works and its National Lamp Works

Alleghany Flowers

Most of the wild flower handbooks are uninteresting volumes except to the one looking to them for identification purposes. Often one wonders whether the author has ever seen personally more than a handful of the flowers covered. While this does not detract from the value of any authentic book, the author of *Wild Flowers of the Alleghanies* has proved that something more may be put into such a book. This author is Joseph L. Harned, whose life has been spent with the study of wild flowers as a recreation and hobby. So into this volume, together with the information of the usual handbook, Mr. Harned has carried his enthusiasm and love for wild flowers. Reading the description of a flower you can feel the author reliving the first time he came upon it in its native habitat. It adds immeasurably to the enjoyment of the book, and for the one turning to it for identification it must inevitably establish a feeling of kinship with the writer. The volume is illustrated with many line drawings plus eight beautifully printed color plates by Mary Eaton and F. S. Mathews. It is published by the author, well printed and bound, and available from him personally at Oakland, Maryland, for $4.50. It is worthy of the highest recommendation.

Naval Stores

Romantic is the story of naval stores. It begins with the first days of the colonies, when crude gum from southern pines calked the ships that fought the French and Spaniards. It extends through the Revolution and the War of 1812, during which naval stores made watertight the bottoms which enforced American liberty. It threads its way through the romantic tales of the famous clipper ships. Now the story is diverted from the sea, for most of the turpentine and rosin is used in other industries, but it has expanded to include a $50,000,000 industry in the South. The tale is told by the U. S. Forest Service in Miscellaneous Publication 106-MP, entitled *Pine Tree Treasures,* which is available from the U. S. Department of Agriculture as long as the supply of copies lasts.

Japan Transplanted

If the pocketbook will not permit a trip to Japan right now perhaps the next best thing would be a visit to the Japanese Garden of the Brooklyn Botanic Garden. This fascinating spot of the Orient transplanted is described in Guide No. 4 of the Botanic Garden. This leaflet is profusely illustrated and descriptive of the garden and its significance.

A Garden with Gates

Among the poetry recently published, "Old Houses" and "I Let Him Go Without a Tear", appearing in a book of poems by Harriet Hall Shumaker, deserve much more than the passing notice this column can give it. Miss Shumaker's volume is entitled *A Garden with Gates,* and is priced at $1.50 by Marshall Jones and Co.

NATURE IN PRINT

Saving the Trout

To the average fisherman, the stocking of a stream consists merely in dumping live fry or fingerlings from a hatchery into the waters and allowing Nature to do the rest of the work. That the problem is far from being so simple is the text taken by Edward R. Hewitt in his recently published book, *Better Trout Streams,* published by Charles Scribner's. For trout to live, streams must be cultivated as are gardens; they must have good hiding places for the fish, an abundance of food, good spawning-grounds and rearing places, he tells us. They must have only a certain degree of acidity or alkalinity for best results. Otherwise, there is a waste of time and money. Mr. Hewitt discusses in his book other aspects of the problem—trout enemies, the controlling of streams, the raising of fish in ponds. To his conclusions he brings the experience of fifty years' observation. He has been a student of trout and their ways since childhood, and has for some time owned a wild stretch of water on the Neversink River, in Sullivan County, New York. On this he has conducted various experiments, the results of which he also publishes in his book. His writing has a wider appeal than the subject indicates, for it deals in terms all fishermen can understand, with the subjects closest to the angler's heart. The volume is priced at $3.

The Cabin in the Clearing

If all the people who have wanted, at some time or another in their lives, to build log cabins had achieved their aims, the Maine woods and the shores of the Great Lakes would have more buildings than New York City. Few have managed to round out their years without the urge to find some sheltered nook in which to raise the rustic structure of their dreams. Directly catering to this desire is a recently published book by an architect who has exclusively devoted himself to building such cabins. It is *The Real Log Cabin,* by Chilson D. Aldrich, and contains all that any enthusiastic outdoorsman will wish to know both about the details of construction and the costs. Mr. Aldrich helps you select the style you wish, shows you how to plan the interior, how to lay the roof, build porches, make cupboards and do the thousand and one things necessary to accomplish the snug comfort that a cabin brings. The book is published by Macmillan and is priced at $2.50.

Bulletin on Plants

A most useful little leaflet on *House Plants, Their Cultivation and Care,* has been issued by the Brooklyn Botanic Garden of Brooklyn, New York. It deals with temperature, soil conditions, re-potting, dusting and insect control, and will be of value to every housewife or indoor gardener.

Abroad with Spring

Not long ago a prominent scientist said to us, "This age is research-crazy. There are hundreds of men who spend their lives on cross-sections of a hair of an elephant that would not recognize the elephant if they saw it." This attitude has been reflected in many Nature books that have been so technical in terminology and approach that the average layman can gain neither pleasure nor profit from their perusal. Such an accusation cannot be made, however, against *Nature Rambles,* the latest book from the pen of Oliver Perry Medsger, which deals with the Nature that is found by the untrained city or country dweller along the roadsides or in the fields; the Nature that these people wonder about and want to know about without delving into scientific realms. Dr. Medsger takes his readers for a walk along the swamps and through the meadows and into the woods, as a Ranger-Naturalist takes his parties over the trails. He explains simply and adequately the various phenomena seen, from the blooming of the first skunk cabbage to the ways of the garter snake. He makes every paragraph interesting by the very simple procedure of answering in it some question that must have recurred time and again to even the most unobservant as he strolled through forest or along pond. Dr. Medsger's book is illustrated by sixteen plates in color, fifteen half-tone illustrations and forty text illustrations. It is priced at $2 by Frederick Warne and Co., Inc., New York, the publishers. P. F. H.

Forests and Hills

If the national forests did not protect the vegetative cover in the high mountain watersheds, the intermountain farms and industries would be hard hit. If these preserves did not exist and the forests were destroyed, many of the valley communities of Utah, Nevada, southern Idaho and parts of Wyoming would have to shut up shop. Such are the conclusions reached in the new edition of *What the National Forests Mean to the Intermountain Region,* published by the Forest Service as Miscellaneous Circular 47-MC. This bulletin, which may be obtained from the Department of Agriculture, Washington, thoroughly discusses the part of the national forests both in economic and recreational aspects, and outlines the methods by which the Service helps to perpetuate the ends for which the forests were created.

A Baynes Book

The works of Ernest Harold Baynes live after him and some have now been gathered into a little volume entitled *My Wild Animal Guests,* edited by Louise Birt Baynes. Here we have three wild animal pet stories —of a young white-tailed deer, a wolf cub and a sextet of skunklets. In them are the affection and understanding that Mr. Baynes had for the wild world and for the specific members of it whose intimate acquaintance he made. Readers of Nature Magazine may recall the last two mentioned of the three stories since they appeared in our pages in the first year of our existence—1923. They well stand the retelling and this present volume makes an attractive gift for him who may love the outdoors as Baynes loved it. The publishers are Macmillan and the price $1.75.

Boundary Commission Reports

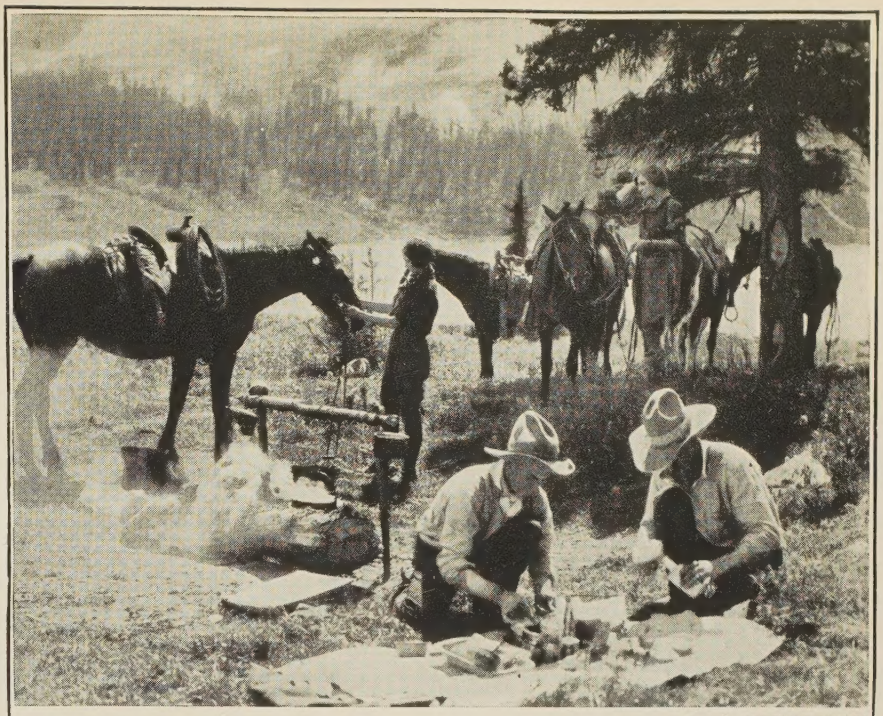
A territory of 52,480 acres has been recommended by the Yellowstone Boundary Commission for addition to Yellowstone National Park, according to the report of the Commission issued recently. The much-debated Bechler River Irrigation project, which would carve 17,280 acres out of the southwest corner, is opposed by the Commission, which also urges the retention of the 40 square miles between the Snake River and the present southern boundary. The additions to the park proposed by the Commission include the famous Thoroughfare country, embracing the headwaters of the Yellowstone River, and will round out the southeast corner to a natural boundary. Some of the finest mammal habitat country in North America will be preserved if Congress follows the recommendation, for here mountain sheep, elk, moose, marten, mink, and lesser animals abound. Scenically, it is unsurpassed. Most of it is eight thousand feet above sea level, and as rugged and wild as any part of America. The decision on the Bechler Basin scheme will, it is hoped, end for all time the long struggle the Idaho irrigation interests have made to wrest this delightful tract from the Park Service. Sitting on the commission were Dr. E. E. Brownell of California, Dr. Arthur E. Morgan of Ohio, Dr. T. Gilbert Pearson of New York, Charles H. Ramsdell of Minnesota, and Arthur Ringland of Washington, D. C. That full consideration was given the problem may be seen from the fact that three weeks of field studies were supplemented by public hearings in Wyoming, Idaho and Washington, D. C., and following these, more than a year elapsed before the publication of a report.

Isle Royale Approved

Isle Royale, an island in Lake Superior about 45 miles long and five miles wide famed for its great moose herd, will be the twenty-fifth National Park as soon as the private lands are turned over to the Federal Government. The addition to the parks of this interesting area, which is practically in wilderness state, was made possible by act of Congress approved by President Hoover during the last session. At present there are 9,121 acres of public land and 2,240 acres in State ownership. The remaining 123,520 acres must be purchased by public and private donation and deeded to the Government before the park will come into being.

Bad Fire Year

The most destructive fire year in the history of West Virginia, 1930, saw the burning of 346,000 forest acres, and the greatest expense, both to land owners and forest-fire fighting organizations, ever incurred. Forestry organizations in the state realize that better timber protection must be forthcoming and have asked the cooperation of land owners to the extent of contributing one cent an acre to the fire fund. So far many owners have turned in their share, but the failure of others to aid is jeopardizing the forestry situation in West Virginia.



H. ARMSTRONG ROBERTS

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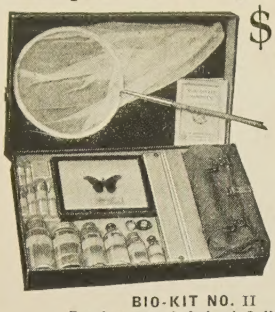

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THE BIO-SETS

IMPORTANT ANNOUNCEMENT!

We are now including in our improved BIO-SET, the new 350-power Wollensak Microscope, at no increase in price.

THE **BIO-SET** is a complete slide-making outfit, including in addition to the microscope, various chemicals, stains, dissecting instruments, glassware, and preserved plant and animal specimens necessary for the preparation of slides, together with a copy of "An Introduction to Slide Making". This book gives simple and complete directions for this fascinating nature study.

THE BIO-SET JR. is also a complete set at a more moderate price, including the new improved 110-power Wollensak Microscope.

WHILE THEY LAST! We still have a few of the 250-power and 100-power microscopes on hand, which we are disposing of at **half price.** These are, of course, new, first grade instruments, absolutely guaranteed, and reduced in price only because of the replacement of the instrument by the new model. For prices, see below.

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Gentlemen:—Enclosed please find $.....for item(s) checked below, money to be refunded if not found entirely satisfactory:

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- ☐ BIO-SET (improved) with 350-power Microscope..... 27.50
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- ☐ Microscope only, 350-power..... 18.50
- ☐ Microscope only, 110-power..... 10.00

WHILE THEY LAST!

- ☐ Microscope, 250-power, formerly $20.00, now 10.00
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NATURE NEWS and VIEWS

Male Helpfulness

Helen Patterson Williams' item in March Nature Magazine concerning the wren which built her nest with metal construction has elicited an interesting comment from Eugene C. Graham of Kansas State College, who believes that it is the male who contributes the junk shop to the nest. He writes concerning an episode he witnessed: "As usual, the male arrived a little early, selected his nest and immediately began carrying in all kinds of trash, singing his best all the time. When a female appeared a few days later, she seemed to be impressed with his singing, but not with his nest building. She immediately threw out all his collection of junk and proceeded to build a nest as she wanted it. But before the eggs were laid, a second male appeared, and a battle began which lasted all day. At night the female left with the new mate. The first male still had hopes and began carrying in his collection of small nails, hairpins, old safety pins and bits of stiff twigs. By count I found there were over forty pieces of metal in the nest and no soft nesting material. I cleaned out this junk, but in a few days the wren had carried it all back again. Since that time I have had several similar experiences with wrens and now I find it pays to have a few more nesting boxes than there are pairs of wrens in order that the junk-filled nest selected by the male may be abandoned when the mate is found. Last season I had seventeen pairs of birds of nine different species nesting within a hundred feet of my home."

Hudson Highlands Preserved

Extension of the United States Military Reservation at West Point by 10,000 acres has meant that the entire Hudson River Highlands west of the river will be preserved as a semi-wilderness area, and virtually a public park. This addition, together with Harriman and Bear Mountain Parks, and the 4,000-acre Black Rock Forest, privately owned, comprises a total of more than 60,000 acres in this region to be withdrawn from development. It is expected that the military authorities will open the land to public use to some extent, and allow hikers to take advantage of the old trails that traverse this picturesque region.

Rats and Buildings

The cost of rat-proofing all the construction on many American farms would amount to less than the loss occasioned by rats on the same farms in a single year, the Department of Agriculture reveals in Farmer's Bulletin 1638—F, which is devoted to instructions for building so rats cannot enter. Numerous cities are requiring contractors to rat-proof new buildings, the bulletin states, and outlines the latest methods of keeping out the rodents for the benefit of builders and farmers.

Porto Rican Children

It is not essentially the function of Nature Magazine, devoted to the interests of the out-of-doors, to deal with human welfare, a subject more efficiently left to other publications, but occasionally a situation arises which cannot be ignored by any group which considers humanity at all. Such a situation exists now on the Island of Porto Rico, where, Governor Theodore Roosevelt writes, 42,000 children, representing only the neediest cases, are being fed by private funds. Should these funds fail, death will result to thousands of Porto Rican children, and crippling disease will strike thousands more. These lives should be a primary consideration of conservation-minded people, who are asked to contribute to the cause of humanity with that same generosity with which they have given to the conservation of the out-of-doors. The Porto Rico Child Feeding Committee, 450 Seventh Avenue, New York City, is in charge of this valuable work.

Or Is It Charity?

Curtis K. Skinner, Park Ranger at Yellowstone National Park, doesn't believe the story of *Androclus and the Lion* and the ancient fable regarding the grateful tiger that saved the life of the native who, years before, had pulled the thorn from his foot. At least, he feels, those kinds of animals do not live in Yellowstone. According to his story, written in Yellowstone *Nature Notes,* he came across a cow elk trapped in the ice on the Yellowstone River. She had punched through the ice with all four legs and was stuck fast. Skinner went to her rescue on the perilous surface and succeeded in boosting one of her rear legs out of its vise. As he got the other rear appendage free, the old cow barked at him and kicked with all her might in his direction. While he was working on her fore legs, she kept barking and "batted" with her head. Finally, when free, she chopped at him with her forefeet and managed to tear a hole in his trousers. Such is the gratitude of at least one animal in the park. "I've been duped before," writes Ranger Skinner, "or is it charity?"

Canadian Rockies Pioneer

Peculiarly enough, Americans seem more desirous of honoring and remembering those mountain climbers who have conquered the European Alps than the adventurous souls who scaled peaks in our own Rockies. Probably this attitude arises in the innate imaginative powers which enlarge the unseen to greater dimensions than the seen. There is one mountain climber, however, whose achievements citizens on this side of the Atlantic have been proud to honor—Edward W. D. Holway. This man was a banker of note, a botanist of first rank, and one of the foremost explorers of the ranges lying west of the Canadian Rockies. His exploits are recited by his bosom friend and companion, Howard Palmer, in a book recently published by the University of Minnesota Press, and make interesting reading both for those in the freemasonry of mountaineering and those who prefer to hear what others do.

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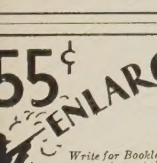

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Forest Fire Penalties

Present-day carelessness in regard to forest fires would receive a decided check if the penalties therefor enforced in the days of Frederick the Great were re-enacted. In a proclamation on December 3, 1775, the Emperor decreed that "Anyone starting a fire in or within 100 paces of a forest, or using a pitch torch or any fire when fishing in any lakes within and on streams or creeks flowing through a forest, or who smokes tobacco during the dry or summer season within a forest, even though no damage be done, shall be punished with a 4-week jail sentence, and, if any damage results, shall pay such damage. Any person wilfully or maliciously starting a fire in a forest, with intent to damage said forest, shall be punished with a 10-year penitentiary sentence at hard labor, and upon establishing the moral responsibility the sentence may be increased even to the death penalty." Of course, such punishments should not be inflicted today, but the force of public opinion should be as keen to prevent fire losses as was the force of the German ruler a century and a half ago.

Hooking a Beaver

The average fisherman is accustomed to cast for trout and wind up with snags or sticks or leaves, but what would he do if he found he had hooked a fifty-pound beaver? Such was the experience of Dr. C. M. Shepard of Columbus, Ohio, while fishing one day in Glacier National Park, on the edge of Swiftcurrent Lake. The beaver, he writes in the park *Nature Notes,* was as surprised as he and started out into the lake. He finally got to the end of the line, and his progress ceased therewith; so he dived and headed toward the fisherman, but, catching a glimpse of him, tried to go lakeward again. Once more the line prevented him, and he was dragged back by the recoil of the rod. He tried other directions, with the same result. Finally he went berserk. "He struck out in all directions with feet, leg, tail, body and head straining simultaneously," Dr. Shepard writes. "He thrashed water into a column several feet high and as many in diameter. In less time than it takes to tell it, his frantic efforts dislodged the hook and he was free." The hook bore some of his hair from chest and neck, but apparently had not cut the skin. The animal soon reappeared on the surface and stared at the fisherman, evidently trying to make up his mind whether this individual had anything to do with his recent plight.

How to Be Beautiful

"Instead of running for shelter the next time a soft patter of rain descends, don old clothes and go for a hike, turning your face up to the heavens, letting the gentle dropping of the rain act as a beauty treatment. Snow falling on the face also stimulates circulation and so brings a surge of clean, new blood to the skin surface, improving the complexion wonderfully." So writes a complexion expert in the woman's column of a syndicated news service. In other words, get out-of-doors, where, the latest theories seem to indicate, health and beauty run hand in hand.

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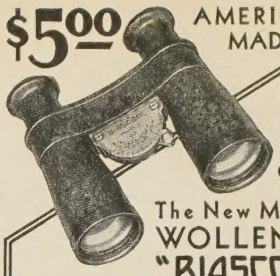

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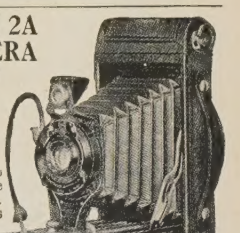

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EDITORIAL BRIEFS

FROM now until the fall rains we have with us the season of forest fire hazard. Every year we have it, unless it be an abnormally wet summer, and every year the public is urged to be careful with match, cigaret stub, pipe heel, and campfire. Yet every year, also, many thousands of dollars' worth of timber and property go up in smoke born of a careless act. Further on in this issue, under the title of "Once Upon a Time", is a brief dramatization of such carelessness. Every lover of the forest and the outdoors owes it to himself and to his fellows not only to be personally careful but to carry the word to others. Public education is the strongest guarantee of the future of our forests.

• • •

There is a fascination about the study of the heavens that is strong, natural and more general than many realize. A monthly astronomy article has been an essential part of this magazine since its earliest days. It is widely read and the accompanying map is much used. In the light of this interest the article in this issue on the Chicago planetarium is specially appropriate. It points to the vast lay interest in the mystery of the heavens and of the movements of the stars and planets in their courses. Such a planetarium is an extra-educational feature that should be far more generally available in our country. We are lagging behind Europe in recognition of this fact. The start that has now been made by Chicago and Philadelphia is one that should be quickly followed by at least every major city in these United States. A planetarium should be considered necessary to every well-rounded school system.

• • •

One of the greatest weaknesses of any movement for reform is the often glaring inconsistency and hypocrisy of some of its most active adherents. Recently several thousand rats were left homeless by the razing of a large and ancient market structure. In the interests of public health the municipal authorities announced a program of extermination by poison. This brought protest from protagonists of the fundamentally fine cause of preventing cruelty to animals. The city official confronted with the rat problem was waited upon by two earnest ladies who pled at length for humane treatment of the dispossessed rodents. With an inward grimace of exasperation the official listened while his gaze was focussed upon two fine mink summer furs that graced the necks of the protestants. His thoughts wandered from the doomed rats to the picture of the tortured animal who had writhed—perhaps starved—in the hold of a trap of steel that these advocates of humanity might wear summer furs.

• • •

We often wonder that those whose concern it is to develop and safeguard the wild or formal beauty spots created in our cities don't give up in disgust. We had thought that public education had just about checked deliberate and thoughtless vandalism, specially in our National Capital. So to confirm our convictions we called up Mr. F. E. Gartside of the park division, feeling that Washington should be rather a typical case in point. When he got through listing the de-flowering of lilacs, uprooting of rose bushes, auto parking on lawns, preempting of sod from newly-sodded spots, ravishing of pansy beds, appropriation of park benches, and many other acts of vandalism, even to the carrying away of drain covers as souvenirs, we were jolted out of our complacent feeling that we are progressing. Still, Mr. Gartside told us, things have gotten better during his sixteen years of service. But if this sort of medieval attitude toward public property is general our schools, civic groups, churches and the parents of the rising generations have got a job to do as well as have those exercising police authority. Collectively our outdoor manners need an Emily Post.

• • •

Recent notes in Nature Magazine on the starling and sparrow problem have elicited a letter from a reader in which he tells of organizing groups of boys to annoy the birds with rifle and slingshot. So effectively did they kill and harass the birds, he writes, that neither species bothers now, and song birds have increased as a result. However sincere the intentions and beneficial the results, we wonder if such method employed is wise? To organize boys to kill, even to keep down creatures with harmful habits, defeats, we feel, the entire aim of conservation education, which seeks to build up habits of protecting animals and birds and to discourage destructive tendencies. The urge to kill, a hangover from our savage ancestry, is difficult enough to overcome without being aided and abetted. Furthermore, just as the capture and punishment of human wrongdoers is exclusively a matter for authorities, not private individuals, so is the regulation of predatory wild life an affair of officials, not boys, who in many cases are not able to recognize harmful from beneficial species. To put the control of sparrows and starlings, both of whom have good traits, in the hands of youths is at best a haphazard procedure fraught with dangerous consequences, and inimical to the best interests of what we conceive to be conservation.

"WITH GUTTURAL, CHAT-LIKE CLUCK-
INGS A CATBIRD BEGAN
A WHISPER SONG"

NATURE MAGAZINE
VOLUME 18 JULY · 1931 NUMBER 1

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BIG DAY

BY WILLIAM VOGT

ILLUSTRATED BY R. BRUCE HORSFALL

WHEN our host called me, at half-past one, he stood with his back to the bedroom door. I did not quite have the moral courage to crawl deeper beneath the covers, in defiance of his smile. I stretched, hoping he would show a trust I might abuse, and leave. He didn't. He had entertained guests on Big Days, for years. "There's number one for your list," he said, with meaning. "At one thirty-three. Clear. A fine moon."

I listened, almost awake, now. Sure enough! From the meadows south of the house came the troubled sweet pipings of a killdeer with family cares.

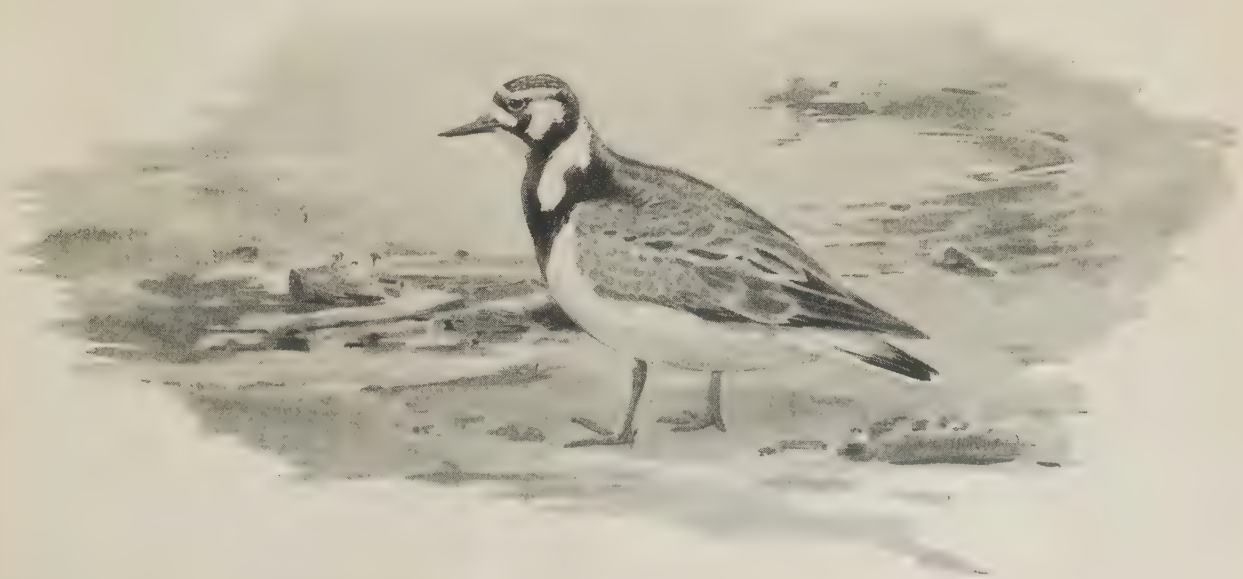
"And there's number two," I countered, "one thirty-three and a third. Clear—for a wonder. Bacon in the offing." I was still drowsy but I had caught a far-away, whispered *hoo-hoo-hooah* of a barred owl.

"Good," said our host. "That's my owl. But now we won't have to hunt him up. Going with us today?"

I threw back the covers, shuddered in the chill of the May morning. "Be with you before that bacon's cooked," I said. The air was not enough. If I were to be any use, that day, more heroic measures were required. I jumped into a cold tub, drawn before I turned in. When I began to pull on clothes, I thanked the Red Gods for the farmer's wife. It was she who, at this hour when graveyards yawn, was preparing the kind of breakfast to carry bird lovers through a strenuous day. Oh, perfect woman!

While our party, each pretending that he is as alert as if he had slept a full night, consumes a spacious breakfast, perhaps a word had better be said in explanation of the Big Day.

Our host is that most fortunate of mortals: a man whose hobby is birds, and who is able to give them all the time he desires. For years he has studied intensively the county in which he lives—in southern New York—and it is a crafty bird whose private life escapes his surveillance. Loving birds, he also loves mankind, or at least that portion which shares his enthusiasm, and every spring when the great waves of migrants are due from the South he indulges in the practical philanthropy of entertaining numerous friends. The purpose of the gatherings, besides pleasure, is to take bird censuses of his home county. The data acquired, from year to



"WHAT, DID YOU GET A TURNSTONE?"

"SOMEWHERE, IN A MARSH FAR BEYOND SIGHT, A BITTERN BEGAN TO DRIVE HIS STAKE"

year, are tabulated and correlated and many interesting facts are slowly emerging from the masses of information.

At the conclusion of a survey all forces—usually another party has combed the south end of the county—concentrate in Brickyard Swamp for a comparison of notes, and for those triumphs over competitors, which give the day especial zest. There are many "late records" or "early records"; some "first records for the month"; rarely, and excitingly, "first records for the county!"

On this particular day the field card read, "Weather: clear; Temperature: cold, A.M., hot, P.M.; Wind: breeze from East, late afternoon." And the observers, besides our host and myself, were a professional ornithologist who has roamed from Ross Barrier to the sub-Arctic; a publisher who is one of the most accomplished field naturalists in New York; a business man who is only slightly less skillful; and a high school teacher of biology who, along with a vast knowledge of natural sciences, has mastered the difficult feat of following small birds with 12-power binoculars.

With breakfast out of the way, and sleepiness at last vanquished by quarts of excellent coffee, we halted for an unproductive moment outside the house, and then piled into the old Cadillac. It was muddy, from preliminary trips of exploration, and even our host admitted that it had seen better days; but it carried the fragrant burden of the memory of past years. Were there some asphodel meadow, dotted with lakes of petrol, many grateful bird lovers would contribute to send there this scarred veteran of many swamp and forest battles! But Stissing Mountain, our first destination, is nearly as idyllic and the old car snorted with evident satisfaction that at least it was still far from the inactive list.

I have intimated that our host is fairly familiar with his county birds. He gave us a demonstration. "I think we'd better stop just ahead," he said. "We ought to get Henslow's sparrow. We might miss it later." He drove on a hundred yards. We came to a concrete bridge. "A sixth of a mile past the bridge," he said, as though a singing Henslow's could be ordered, like quail on toast.

He stopped the car, and we climbed out. Silence was the rule, both from a desire to avoid alarming the birds, and from awe of the morning. The man who dies without having spent a few hours before a May dawn, far out in the country, does not deserve to have lived! A silence, almost incredible to our city-dimmed ears, seemed to hang like a black curtain behind the face of the moon. It was too early in the season for much of an insect chorus, and the frogs, perhaps disturbed by our car, were still.

We listened intently. "Odd," muttered our host. "Thought we'd get the Henslow's here." Then, as if on his command, we caught a wiry faint "flee-*sick!*" from the meadow beside the road. Somewhere, in the blackness of that dewy grass, a tiny sparrow had met his obligations like an officer of the Guards. But he seemed to do more; with his weak note, the chorus began.

The lash of a whippoorwill's cry flogged the night. With guttural, chat-like cluckings a catbird began a whisper-song at exactly twenty minutes of three. (We must not forget, on our joy in the morning, that we are here for the purpose of collecting facts!) From a nearby thicket another catbird squawked and cackled a little. The first songster considered it a challenge; like a self-conscious pianist it tentatively ran up and down the range of its songs. The challenger, apparently assuming that the gage had been taken up, broke out with a burst of music that can be described only in terms of light. There is nothing like it in the world, save colored fire from a rocket!

We tore ourselves away from this duel of virtuosi, and marked down "grasshopper sparrow", as an insect-like buzzing rose from the haunt of the Henslow's. The catbirds would probably sing until well after sunrise. We could not wait.

Several miles farther on, a faint song came through the open window above the noise of the motor. We jumped out. An oven-bird. Not the familiar "Teacher! Teacher! Teacher!" of hot, midsummer days in the woods, but the night-song which, for so many years, puzzled Tho-

reau. A cheerful "Chewink!" told us that the towhee wakes up smiling. The rising semitones of the field sparrow came a split second ahead of the round "Cow! Cow!" of the blackbilled cuckoo. And by this time the chorus was swelling so thick and fast that we could stop to exult only in the high points. Somewhere, in a marsh far beyond sight, a bittern began to drive his stake. A prairie horned lark sifted down his tinkling arpeggios. I remember, vaguely, that some one said they are very like the song of the English skylark. There were comments derogatory to Shelley's taste in bird-song—if, indeed, it was the skylark he heard—and suddenly we noticed that the East was pushing off a red blanket. Bad news for the morrow's weather, but we did not worry now.

We jumped back into the car and swung into a lane. If we were not at Stissing very soon our chances of hearing the elusive rails would be small. It was not far to go. When we finally abandoned the Cadillac for several hours, it was barely light enough for us to be able to read; the clock stood at twenty minutes past three, and the plebeian ebullience of the first song sparrow greeted the day.

We already had an interesting list but we felt, as we hurried into the birches along the misted lake, that the business man was right when he said, "We ain't seen no birds yet!"

A stretch of cold days had ended the night before. In the early hours a breeze blew from the South. The moon was not far past full. The warblers, straining at winter's leash, came over during the dark hours and now our binoculars showed us tree-tops that had caught, and held, shreds of the sunrise. Except, of course, that these wisps of light and color could sing!

Excited voices began to enumerate species. Why, here was almost every possible warbler! I have not the space to describe the tropical wealth of their colors. But consider their names! Blue-winged; golden-winged; yellow; black-throated blue; myrtle; magnolia; bay-breasted; black-poll; black-throated green—these warblers are the perennial and certain delight of all conditions of bird lovers. The experts and the novices, the enthusiasts and those who prefer to do their birding from an armchair, all turn out for this spring flight. As I watched, through my glasses, in the hope of picking up the Cape May or the pine warbler our list lacked, I was struck by the answer to a question which had long puzzled me: Why do I find such abiding satisfaction in wild things?

I suddenly realised that here the critical attitude is impossible. Most of us find our common pleasures limited, to some degree, by our standards. If we know anything about a given situation—a concert, for example, or an exhibition of paintings—we become, by that knowledge, conscious of imperfections.

When, however, we turn to the out-of-doors, we meet perfection. By no stretch of my imagination could I have improved last night's catbird duet. The three bitterns, gravely flying in a line along the horizon, may be bungling their maneuvers. But I don't know it. I have never been anything even approaching a bittern. Ergo, I carry back to the city with me a flawless picture.

"UNDER THE RINGING HAIL OF THE WOODCOCK'S EVENING FLIGHT SONG, WE PILED INTO THE CARS"

But this day there was no time for reveries. We walked the entire length of the lake; certainly few warblers escaped us. We had yet to add the yellow and olive Cape May, with its glowing rufous cheek-patch; chance might be with us, later. The pine warbler also was missing, but our host knew a pine-covered side hill where he promised we should hear its chippy-like trill.

As we hastened back to the car, our attention shifted to the lake itself. Of course all the commoner birds were there: the red wing with his scarlet and gold epaulettes; the marsh-wren, jeering us as we passed; the grebe, sunk low in the water and mocking the cuckoo which began to call before dawn; the black ducks, towering into the air, quite as though there were no falcon's nest on the cliff behind us. But we were a little perturbed by the silence of the rails. It was certain the rival party would have them on its list. We could not afford to leave without records!

Imitations of their cries, of varied expertness, elicited no response. Our host brought out his useful revolver. He shot into the cattails. Instantly a grunting, unbirdlike and new to me, exploded from the swamp. We exchanged questioning glances. I was completely puzzled. Most of the rest of the party were capable of a shrewd guess, but they waited for the publisher. He, one of the most courteous of men, hesitated. Then he laughed. "That's right," he said, in his philosophic drawl, "king rail. It kept me guessing for a long time, too."

Again, for luck, our host fired into the reeds. There was a nearby squawk. Then a mite, looking much like a chocolate Easter chick with a curved bill, fluttered up from the edge of the marsh. It skittered over the top of the grass, almost between my legs. I dived after it, then hesitated. It was too fragile to be touched. It took a header into the reeds, melted into the background. "Virginia rail," we marked on our list. That made two rails, and we were satisfied. It was time to move along.

We drove toward the Hudson River as swiftly as the law allows. Brief stops beneath elms that, hitherto, had seldom failed us, resulted in a complete and alarming absence of warbling vireos. But as we jumped from the car to identify two soaring hawks, we heard a precipitate warble from a lilac hedge. That made five species of vireos! We began to gloat, in anticipation of the evening meeting. Only the Philadelphia vireo was missing, and if the southern party could report that rare transient in the Northeast, we should gladly pound their backs in congratulation. But we had nine hawks; eight flycatchers; ten sparrows; all the possible swallows; and twenty-seven warblers. They might have had better luck but we wouldn't believe it without seeing their list!

The latter half of a Big Day is always completely different from the first hours; one is possessed by a changed spirit. Instead of an animated responsiveness to the myriads of impressions, we accept whatever comes with the same habitude as we accept our own hands and feet. The pleasant excitement of the morning has wearied the senses; the lack of sleep begins to take effect; and coffee has lost its potency. Besides this, the birds have begun to hide from the heat of the day, and the difficulty of finding new species has increased a hundred fold. Our course down the river, even with the stimulating hope of rare shore birds, has become a placid affair. When lunch is over, we suck our pipes and bask in the warm sun. Our limbs move with an effort and, as if to compensate for the dulling of eyes and ears by fatigue, our noses seem unusually keen to the tangled scents that assail us.

Four fly-catching scarlet tanagers and a frankly curious fawn, mirrored in the blue sheen of a hill-top pool, we took in our stride. In a hemlock swamp the ornithologist turned up a lone mourning warbler, a bird we had scarcely expected to find. An hour's welcome wait by a brook where we hoped the fortune which had followed us all the day might deliver into our sight a hooded warbler, yielded only the Louisiana waterthrush.

The little hills were big enough to cast long shadows, and we sped southward to our rendezvous, confident that our day's list was complete—with a hundred and twenty-five species. Suddenly the business man cried, "Stop a minute!" The tires burned the road, we all jumped out. In a tiny pond, entirely surrounded by houses, was a black-crowned night heron—the first of the day.

When we arrived at Brickyard Swamp it was too dark to use our glasses. The other party was already on hand, watching the courtship antics of a pair of marsh hawks. They hailed us.

"How many'd you get?" we called.

"Not many. Hundred and seventeen."

We groaned sympathetically, and announced our total. It was not a record, but it was not bad. "Get anything good?" they demanded.

We had to confess there was nothing notable on our list. We compared records. It immediately appeared that the sudden cessation in the cold weather had led the main flight of migrants to jump clear over the southern end of the county. Birds that we found common they had not seen at all. We were mildly jeered for having missed the common hairy woodpecker. When we had gone all through the list, the leader of the competitors

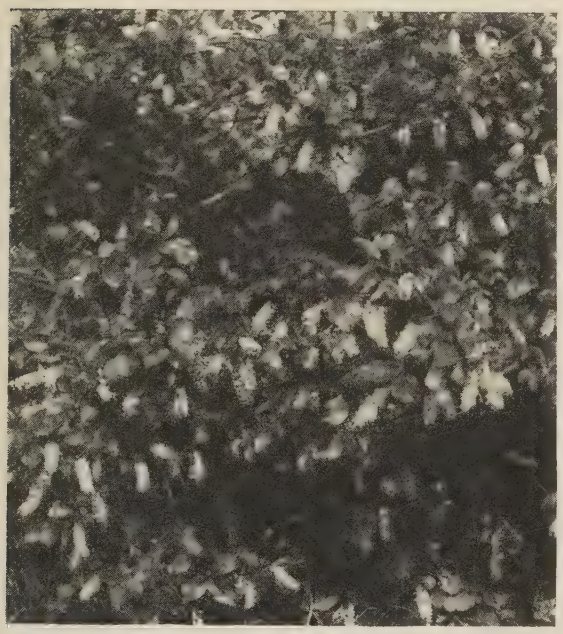
asked, with a self-restraint that was wonderful to behold, "Get any turnstones?"

It was too much for our host. "What!" he whooped, and the tumbling marsh hawks dived for cover. "Did you get a turnstone?"

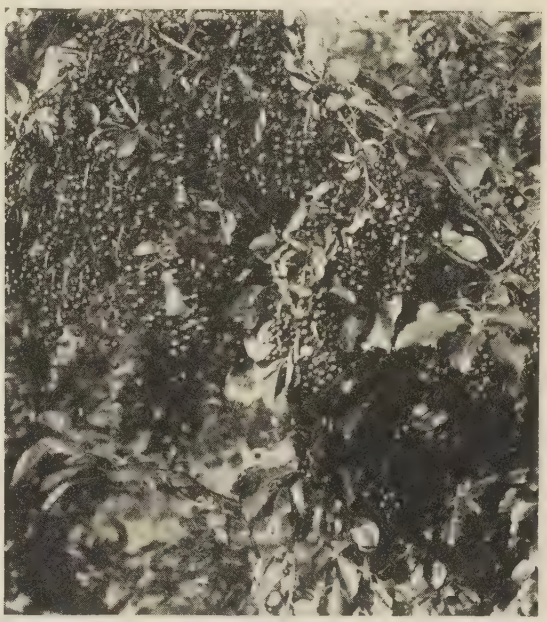
The man grinned. "South of Denning Point. In almost full breeding plumage."

We congratulated each other, and ourselves, on this, a "first record for the county." Then someone mentioned food. There was another cheer—only less enthusiastic than the one for the turnstone. Under the ringing hail of the woodcock's evening flight song, we piled into the cars and turned toward the nearby city.

I was too tired for consecutive thinking. In my head was a kaleidoscope of colors, sounds, smells, movement; and a sense of deep satisfaction that I, too, was an offspring of the earth, and a not too distant cousin of these creatures of the woods and fields and air.



THE CHOKECHERRY IN BLOSSOM
It makes an attractive addition to a grove of trees or shrubs



READY FOR PICKING AND EATING
A heavily loaded bush about to yield its wealth for jellying

THE WESTERN CHOKECHERRY

BY FANNIE M. HEATH

THE western chokecherry, *Prunus melanocarpa,* is more dwarfed and much less choky than the eastern form. It grows in immense colonies on the edge of timber and along the coulees; in fact in any place where protected from the great prairie fires that swept over this country before the coming of Europeans. It is a prolific bearer and where it gets the full sun and wind it is not uncommon to find bushes less than four feet in height heavily loaded with fine large clusters of fruit. This fruit was highly prized as food by all of the plains Nations and certain preparations of these cherries enter into old-time ceremonies and rituals and also into stories, songs, and myths.

It was so highly prized as to supply the name of one of the months in the Dakota calendar. Ca-pa-sepa-wi means "the month when cherries are ripe" or "Black-Cherry-Moon." The time of the Sun Dance was determined by the ripening of these cherries and began on the first day of the full moon when the cherries were ripe.

The gathering and preparing of this fruit for winter use made a busy time for the community. These people traveled for miles to the places where the fruit was abundant and spent many hours preparing them for food.

The cherries were pounded in a stone mortar with a stone hammer and eaten, seeds and all, either when dried or fresh. They were also made into cakes and dried and were mixed with dried meat prepared the same way. I have one of these stone hammers and often think of the hours of labor it must have taken to grind and prepare the winter's supply of this food.

Now we see cars of every make from Fords to Packards parked near these cherry fields and their occupants just as eagerly gathering the ripe cherries. And I have found myself mingling in the throng in "Ye olden days." Some of us, however, may now gather them from our own bushes, for they are very easy to raise either from seeds or roots and they add much to the beauty of any clump of trees. While they will not make a clear crisp jelly alone, when left until fully ripe, the flavor is so delicious that we readily forgive them and refuse to have it altered by even the addition of crab apples.

I sent a glass of this ripe chokecherry jelly to a Maryland jelly expert and he wrote back that it was the best jelly he had ever tasted. Such is its quality.

SUN RIVER CANYON

Here we find the towering cliff-ends of the mountain ridges and peaks

Undoubtedly the most popular geology article ever published in Nature Magazine was "The Autobiography of a Rolling Stone", printed in an early issue. It was by the author of the accompanying article, who now tells another geology story of Montana's mountains in the same vein.

SUN RIVER TELLS ITS STORY

BY WILLIAM C. ALDEN, PH. D.

U. S. GEOLOGICAL SURVEY

"MY MOTHER was a balmy Southern Breeze all sweet and fragrant with the perfume of fruit and flowers; my father was the stern and austere West Wind roaring down across the craggy peaks of the Rocky Mountains. The marriage was tempestuous, the aftermath was stormy and the fruit of the union was a brood of boisterous mountain torrents of which I was one. Fed by the melting snows of winter, nourished by showers and aided by the sun, the wind, the rain, and the frost, and by the gravity pull of Old Mother Earth herself, we were all set at the task of tearing down the Rockies and casting them into the sea. This work of removing the mountains was no simple act of faith to be accomplished between the rising and the setting of the sun. No, it is a never-ending task of scouring and grinding away the rock ribs of the mountains with silt and sand and pebbles for our tools, and pebbles, sand and silt for our burden to be carried hundreds of miles to the sea. Day and night, year in and year out for ages and ages we have labored unceasingly. Had nothing else happened our task would now be much more nearly completed than it is. What has happened? Well, that is quite a lengthy tale.

"The Indians called the Rocky Mountains of Montana the 'Shining Mountains' from their dazzling beauty when the morning sun shone on their snow-clad peaks. So it is quite appropriate that I, Sun River, should have my headwaters back in their rocky fastnesses. One day a party of men came into my canyon to hunt and fish and to look upon the towering mountain ridges and to find strength in them.

"Their God is my God and I, too, get my strength

ANOTHER VIEW OF THE CANYON

Here it is seen from inside the portal carved by the river en route to the sea

WROUGHT BY THE WATERS

The mountain wall, the high-level sag and the portal seen from the inside

from the hills. The mighty power of the sun draws the water vapors from the ocean, the lakes, and even from the surface of the land. The winds sweep them over the mountain tops. Then, chilled to pearly drops of rain or crystallized in sparkling diamond snowflakes, the attractive force of the mountains and of the vast foundations on which they rest draw down the gentle showers, the lazy floating snow crystals, the blinding blizzard, the pelting hailstones and the awful crashing torrents of rain. These are the sustenance of me and my sister streams. We, too, feel the mighty pull of the mountains. Dashing down their slopes and canyons we rip and tear and slash and roar in joyous abandon.

"Issuing from the narrow canyon portal I flow eastward across the plains in a fertile valley until, seventy miles away, I meet the majestic Missouri and give to it my waters just before it begins the series of plunging cataracts, the last and largest of which comprises the Great Falls for which the region is famed. Once in the ancient days a herd of mighty animals, Titanotheres they are called, came down across the plains to drink, and as they crowded to the water I laughed in glee. Swinging swiftly to their side I cut the bank from under their feet and in an instant tumbled them, wallowing helplessly, into the flood. Over and over they rolled like so many great logs until, exhausted, they sank to a watery grave and I buried them there in the sands.

"I will not go back in my story to the time 'when the mountains were brought forth'. There, when I was born, they stood, forming a mighty rampart at the western border of the plains, a vast wall of rock strata crumpled, broken and thrust upward by tremendous mountain-making forces. Even yet there are but few places where puny man can build his railways or drive his automobiles across this enormous barrier. It was this great mountain range that I and my sister streams were set to work to tear down and cast into the sea. Once we had the task nearly accomplished and much of the great Cordillera was worn down to a range of hills, some of it almost to a plain, but those restless forces in the depths of the earth heaved the mountains up again across our path.

"It was easy enough to sweep away the mud and sand of the plains and deliver them to the great Missouri for her to carry onward to the great sea. So, undismayed, we set to work to accomplish a new cycle of erosion. The folded and broken rocks of the bordering plains were carefully bevelled off as smooth as a floor and nicely strewn with gravel composed of fragments torn from the mountain slopes and smoothly rounded by rolling for miles along the rocky bed. To wear away the mountains

IN THE ROCKIES OF MONTANA

View of the jumbled peaks from west of the town of Great Falls

THIS REMINDER OF THE PAST IS STEAMBOAT MOUNTAIN

Appropriately enough this mass is described as "a mighty rampart at the western border of the plains"

was much slower and more difficult. But finally I had cut through the mountain wall a great gap hundreds of feet in depth and four miles in width, and beyond this I swung freely to and fro across the piedmont terrace. You can still see a great remnant of this terrace in the flat-topped upland crossed by the Park-to-Park Highway between the towns of Gilman and Chouteau, but now it is hundreds of feet above the channel where my restless waters flow. As you look westward from this high bench-land you can also see the great four-mile gap breaching the upper mountain wall and you can easily imagine the smooth terrace rising gradually, as it once did, to the threshold of the gap. Here then was a second great cycle of my task of erosion accomplished in a grand way.

"But again the mountains were uplifted and then, as the Great Ice Age dawned, the Frost King said he would help while I and the other streams worked on the neighboring plains or slumbered a while in the bordering valleys, which had become flooded as lakes. So he showered the mountains with glittering snowflakes. Year after year, century after century he piled them up on the peaks and slopes and filled the tributary gorges like vast hoppers to feed the mills of the gods. Compressed by its own weight, the vast mass of accumulated snow froze to granular ice and began to move as a slow but irresistible glacier. Tributary glaciers, joined in one vast sea of ice, crowded through the gap and spread out on the piedmont terrace. For a long time the glacier rendered valiant service, plucking away the rocks, wearing away the mountain spurs, grinding, scouring and polishing the ledges, but at last Old Sol got the better of it, the climate became warmer again, the snows disappeared and the glacier lost its vigor and melted away. Then I took up my task again. Refreshed and invigorated by the glacial waters I plunged again into my labor, deepening my channel across the plains and cutting away much of the piedmont terrace.

SPLIT ROCK ON THE PLAIN

It was carried seven miles from the mountains by Sun River Glacier

"Come closer and look at the mountain front. The threshold of the great gap four miles in width is now high up at the top of the lower great white wall of limestone and that lower wall is itself hundreds of feet in height. Now see the great notch or portal which I cut in the third cycle of erosion. It looks small compared with the upper four-mile gap yet it is a thousand feet in

LOOKING UP DEARBORN RIVER VALLEY

The barrier at the front of the mountains on Sun River is breached by a high-level gap with a total of four miles in its width

depth. Enter the portal and look out toward the plains. I worked hundreds of thousands of years to cut that notch although I was helped again by glacier ice.

"Not only did I cut this great doorway but great gulches were also excavated between the parallel ridges back of the mountain front, and through these ridges I cut similar passage ways. The ends of the mountain ridges now form imposing cliffs towering high above my rushing waters.

"The next notable event was the last great stage of glaciation and this has left its record clearly graven in the rocks where all may read. From the vicinity of the Great Falls of the Missouri to the Arctic there extended one unbroken sheet of slowly-moving glacier ice ranging in thickness from one to several thousand feet. At the same time the mountains were buried in snow and all the gulches and canyons were again occupied by glaciers. In my canyon the ice crowded through the great notches, smoothing, polishing and scratching their sides. It crept up the back of the great limestone wall and finally overtopped and filled the high-level sag from side to side—one great glacier four miles in width. Even this width cramped its movement because, after passing the mountain front, it spread out on the adjacent plain as a great piedmont glacial lobe fifteen miles in width and nearly as long from west to east. Doubtless it would have extended somewhat farther had it not encountered the bluff below the head of the high benchlands on the east. At

PHOTOGRAPH BY E. STEBINGER, U.S. GEOL. SURVEY

THE TERMINAL MORAINE OF SUN RIVER GLACIER

The glacier front which stood west of the moraine just overtopped the edge of the high benchland in the background

one point ten miles north of Gilman the ice crowded nearly to the top of the bluff five hundred feet above the plain below.

"The shales and sandstones beneath the plain, which had been crumpled and broken when the mountains were uplifted and which later had their edges bevelled off by stream erosion, are everywhere, within the limits covered by the Sun River Glacier, strewn with rock debris or drift. This was brought out from the mountains by the moving ice and left as a dump when the ice finally melted away. Some very large blocks were carried out several miles. Two of these beside the road northwest of Augusta Cemetery, twelve miles from the mountains, are fifteen to twenty feet in length. North of my course and seven miles from the mountains is a great block of limestone split in two beside the road. Each half is about thirty feet long, thirteen feet high and ten feet in thickness and the whole must weigh fully one hundred tons. So you see the transporting power of the glacier was enormous. Near the mountain front the ice was fully fifteen hundred feet thick and back in the canyon there was two thousand feet of ice. One cannot consider the significance of these phenomena without being impressed by the tremendous forces which Nature has to do her work.

"The limits of the great Sun River Glacier are clearly marked by lateral lines of earthworks, or moraines, which sweep around the eastern front and join as a great hummocky terminal moraine. From the cemetery northwest of Augusta this extends eastward in a broad curve nearly to the Park-to-Park Highway from Yellowstone to Glacier.

"The tourist who is interested in such phenomena will be well repaid if he turns aside from the Park-to-Park Trail and runs to my Sun River Canyon. As the glacier has long since disappeared he can clearly see the relations of the upper four-mile-wide gap and the one-thousand-foot, V-shaped portal breaching the great limestone wall. In the bottom of the great notch is a sluice-like, inner gorge about one hundred thirty feet in depth. This small gorge is a measure of the work that I, Sun River, have been able to accomplish in all those thousands of years since the glacier disappeared. From this, perhaps, you can get some idea of the milleniums that it took for me to carve out the great portal and the vastly longer time that it took for me to erode the ancient valley four miles in width. Back of all this is the still greater lapse of ages since I was first set to work to tear down the mountains and cast them into the sea. When, oh when, will my task be accomplished?

"Men are such clever creatures that it is a pleasure to help them by furnishing my waters for irrigating their fields. But sometimes when they strip the forest cover from my mountain slopes or when their carelessness makes dreadful forest fires which burn my virgin timber and change its beauty to horrid desolation I feel like gathering all my pent-up strength in one vast flood, tearing their tiny dam from its foundations and strewing its fragments widely over the plain. The red man was content to fish in my waters and hunt in my forests, but the restless paleface is not satisfied until he has put all Nature under his feet. Is it for him that all our labor has been expended, and are we to be his servants for all time to come?"

Thus does the Sun River sing on its way to the sea.

A SIMPLE BIRD HOUSE

IT ATTRACTED A WESTERN WREN

BY CARL H. BRYANT

A SAWED-OFF hollow limb blocked up at the back with a board, and the front treated accordingly if the opening is too large, makes a most acceptable home for the wren and the bluebird, and it might just as well function for a considerable number of birds such as the crested flycatcher, sparrow hawk, or any of the small owls.

VERY MUCH AT HOME, THANK YOU

The shy western wren poses after feeding her babies in the hollow-log nest

The one I built was successful beyond my hopes, for a little wren made her home in it. She was not the eastern wren, but its western cousin, who is much shyer and seldom seen around houses. Since my home is situated among the live oaks, I was, perhaps, more fortunate than many who have tried to entice this little fellow. In fact, it was because I saw her around one day that I built the simple abode.

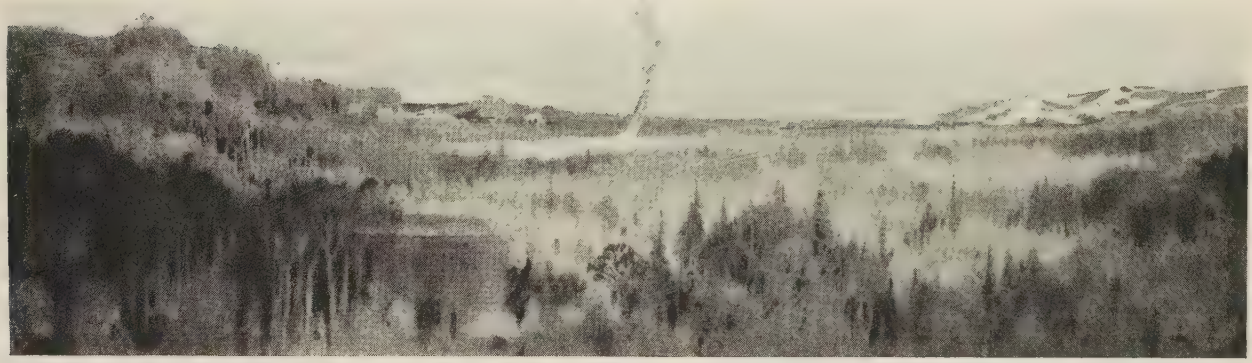
To make the accompanying photograph the camera had to be placed about three feet from the nest, and the picture was enlarged. As the nest was fourteen feet above the ground I lashed a ladder upright with ropes, tacked a platform at the proper place, and left it until the next day. Then I placed my camera with a long string attached. I waited for the sun to light up the scene and pulled the string just as Mrs. Wren emerged from feeding her babies. This was the only time she was still enough to get sufficient exposure but she did not seem to be disturbed at all.

ONCE UPON A TIME

A TRAGEDY OF THE FRIENDLY FOREST

• • •

BY BEN HUR LAMPMAN



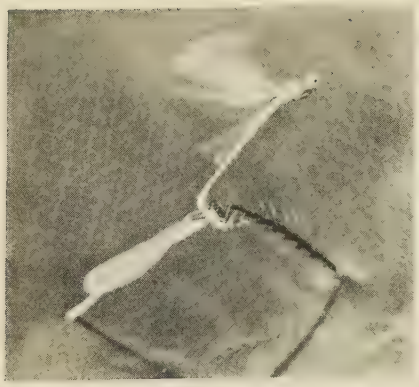
THERE was once, so the tale tells, a place or country called the Friendly Forest. It came by this name because of a benevolence that was evident to the dullest of persons. As to the boundaries of that cool and comely land, they began where the last corn ripens, and in some part they were defined by a broad and hasty stream that was forever telling of mountains which might, on a fine day and from a hill, be descried in distance as a flowing scarf of pearl and amethyst. The boundary beyond, so it was said, was remote past all telling, and but little known save to those who dwelt there. You might enter this forest anywhere, at the gateway of the river where the cliffs were painted; through the notch in the foothills whence the gray squirrels came for mast, or by the twisting game trails that sought the meadows. It was not forbidden to enter the Friendly Forest and partake of its cheer.

It chanced, we are assured by the chronicle, that a wayfarer came to its fringes one day and saw scarlet berries against fern and leaf, and the painted cliffs rising with astonishment from the stream that had hewn them. Now this wayfarer was at the time weary, not so much from miles, of which there had been many, as from certain problems that had drawn too near to him, and from which he sought not final escape but only respite. There is no weariness of the flesh that may be compared to this, and for such an ill the forest was known to be a particular remedy or charm. So, when he came at length to the forest, and knew that his heart had leaped to hear so homely a cadence as the pounding of a woodpecker, and that the strange cliffs might be interpreted by one to whom time was a figment, he plunged into its shadows as you plunge into a pool. In the forest he dwelt for many days, considering matters so vitally important as to be of small consequence elsewhere, and learning much that was needful to learn, and forgetting much that was needful to forget. Here he found healing and all his weariness of mind vanished away.

There was no day on which he did not meet some citizen of that country, and these were birds of muted color and beasts whose gift it was to disappear while yet they should have been visible. Having no fear of them, nor any secret thought in his heart, they came to have small fear of him, so that in time he knew them all and had observed them well at their affairs. From such employment he derived no small degree of interest, and knew a hundred triumphs, and was aware of the open book whose pages may never quite be transcribed by the scholar, nor wholly deciphered by any one, but which are at times clearer than print and more logical than any sermon. He went far inward from the boundary, so far that the remote mountains revealed their features; and he ranged wide through the forest, so widely that he came to the place where streams are born, and the best of all water may be had for the stooping. Calm days. Peaceful nights. Swift healing, till at length there was no need for him to tarry.

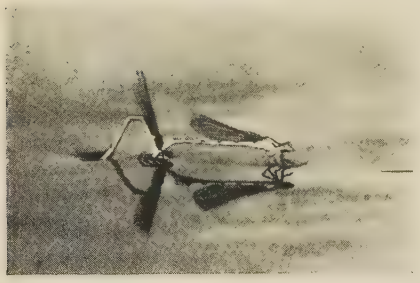
"I am kin and cousin to this forest, and to all things within it," he said as he broke the last camp and smoked the last pipe. His look roved from the painted cliffs to the grand, serene sweep of it and up and over and beyond to the flowing scarf of pearl and amethyst which was mountains. He blessed it with unspoken word, and he left it as friend leaves friend—or so he thought. In the gray ash of the last camp an ember quickened.

Outward he walked, and onward, putting the miles aside as nothing. He strode the hill as though it had been level ground and with a song in his veins. In afternoon he came to a place whence one might send a final message to the forest, and see the painted cliffs no taller than a flint, and the flow and sweep of the trees toward the boundaries that lie back of beyond. It was a crest where trails met and roads began. He turned to say good-bye. And as he turned the Friendly Forest gave a glint that was not sun. Wore a vapor that was not mist. Upward, as a red spear tossed, flashed the tall flame.



FEMALE FLY RESTING
AT EGG-LAYING TIME

While in the air above her the male keeps beating his wings swiftly until the two fly away to another chosen spot

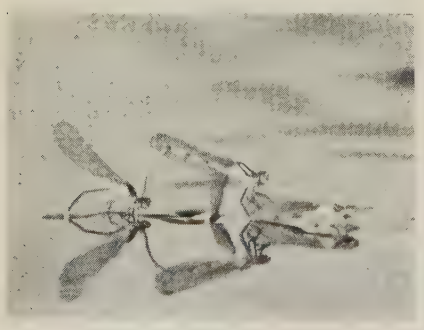


AND SO THE TWO OF THEM
FLEW AWAY

To a spot where the female thrust her tail below the surface to deposit her eggs, while the bit of wood on which they rested floated toward the falls

STARTLED BY THE CLICK
OF THE CAMERA

The two attempted to fly away. But the surface tension was too great and struggle as he would the male could not pull his lady from the now swift waters



THE SITUATION NOW
WAS VERY SERIOUS

But to the rescue came another couple that had been hovering above and with the combined help of the other female and the two males disaster was averted

TWO SAVED FROM GLASSY POND

DAMSEL FLIES EFFECT THRILLING RESCUE ON BRINK OF ROARING FALLS

BY RALPH H. SNYDER

EXCLUSIVE PHOTOGRAPHS BY MR. SNYDER

In the accompanying article Mr. Snyder recounts, in the form of a news story, a dramatic happening which, we must conclude, reveals intelligence in at least one part of the insect world. It is one of those dramas which often may be witnessed by the close observer. To photograph such an incident is even more remarkable, and while one may have to look closely at the illustrations one could hardly expect studio photographs of such an event. We congratulate Mr. Snyder on his success.

WITCHITA, Kansas, June 13—A dramatic rescue in which Mr. and Mrs. Blue Damsel Fly, of Wooded Park, near here, were saved from a horrible death in the churning waters of Roaring Falls by the timely arrival and quick thinking of Mr. and Mrs. Bluer Damsel Fly, was effected here this afternoon. The only witness to the narrowly averted tragedy was Ralph H. Snyder, staff photographer, who succeeded in getting exclusive pictures of the thrilling event.

Mrs. Blue Damsel Fly, according to Mr. Snyder's account of the happening, had been laying eggs in different parts of Glassy Pond during the early part of the afternoon, and finally came to rest on a stick near the Falls. After the egg was laid her husband, who was hovering above her, beating his wings, tried to lift her out of the water, but the surface tension, coupled with her weight, prevented. Heroically standing by his mate, Mr. Damsel Fly struggled to rise as the pair drifted closer and closer to the brink of the falls, but death seemed inevitable.

Just before the two were hurled into the vortex of angry waters, Mr. and Mrs. Bluer Damsel Fly, spending the afternoon in the same way, came into sight. Instantly they sensed the situation and came to the rescue. Risking their own lives, they dropped down to the water, grappled their legs about the body of the male, and pulled him and his weakly-struggling mate free of the racing current that was about to hurl them onto the jagged rocks at the foot of the falls.

So quickly did the event take place that Mr. Snyder, who was on the nearby bank, was powerless to help, and could only watch the almost miraculous escape, awe-struck. He had his camera with him, however, and was able to catch the rescuers and rescued just at the moment when the dark waters were forced to give up the unfortunates they had claimed as their own.

As is the way with heroes, Mr. and Mrs. Bluer Damsel Fly flew away without even lingering to receive the thanks of the grateful couple. They were later observed in another part of the pond, continuing their egg-laying activities as if nothing had happened. Almost the same degree of sang-froid was exhibited by those who had

barely escaped death. They were last seen flying slowly in the sunlight to dry out Mrs. Damsel Fly's wings.

No hint of tragedy could be gathered from the peaceful scene Glassy Pond presented during that sunny afternoon. It is very popular with damsel flies, particularly during the egg laying season. At one end of the pond is Roaring Falls; strewn throughout are lily pads, among the stems of which goldfish play, their sides glinting as if in reflection of the brilliant sunlight that flecks the surface of the calm waters.

Just as during the other bright afternoons this spring, hundreds of damsel flies and their mates were gaily flitting about yesterday afternoon. The males were most gallantly assisting their companions to fly by securely grasping them behind the neck by means of a set of talons on the end of their abdomens. Now and then couples would stop on a stem of grass or weed, and the male would support the female, beating his wings, while she laid an egg on a plant, or dipped the tip of her abdomen below the surface to allow the water to wash off the tiny egg.

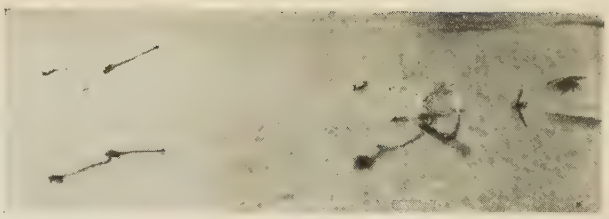
As always occurs in the sunny air-lanes above the surface of the pond, a number of single males were constantly humming around egg-laying couples, sometimes darting at the male in what seemed to be an attempt to break his hold and steal his place. In most instances, however, the couples are very wary, and they dart hurriedly away at the close approach of another male.

Mr. Snyder had come to the pond to photograph this spring activity of the social set, and was resting on the bank with his camera set when he noticed Mr. and Mrs. Blue Damsel Fly circling around a small piece of wood that was barely submerged below the surface. They flew very close to him, and he had an opportunity to note the metallic blue costume both were effectively wearing.

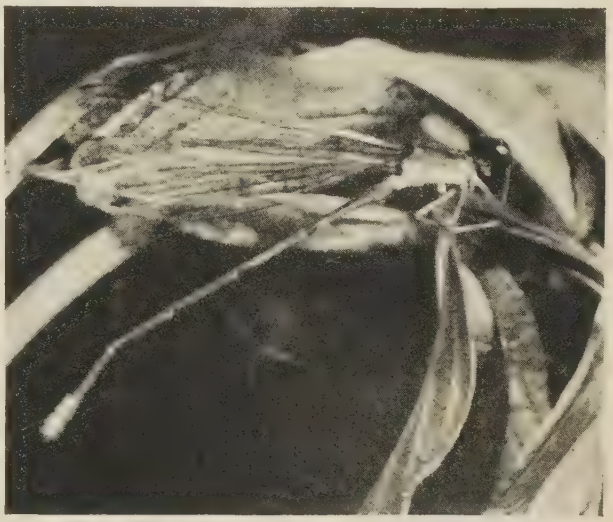
The couple flew around for a moment, then came to rest on the stick, and the female dipped her tail into the water to deposit the eggs while Mr. Damsel Fly beat his wings rapidly to keep her from sinking too far into the water. Mr. Snyder snapped his shutter just as the pair, oblivious to their surroundings, settled on the surface.

While the photographer watched with bated breath, the couple, intent on their own affairs, drifted closer to him. He saw that the female kept slipping farther and farther into the water until she was almost two-thirds submerged, but neither of the two seemed to notice her plight. Suddenly, just after Mr. Snyder had snapped another picture, they tried to fly away, but the clinging waters and the water-laden garments of Mrs. Damsel Fly foiled their efforts. Just at that time, the stick on which they were resting swung into the swift-flowing current of the Falls, and sped with gathering velocity straight toward the fearsome brink. Then it was the thrilling rescue took place, and cheated the waters of a sacrifice that seemed to be inextricably caught in their grasp.

Mr. Snyder was unable to say from which direction the rescuers came, or whether they appeared by chance or had seen the plight of their fellows from afar. Suddenly he saw them circling above the pair, then they dove down to their assistance.



AND NOW ALL FOUR ARE SAFELY AWING
The rescuers speed away, closely followed by the other two actors in the drama



DAMSEL FLY AT REST
Full-sized insect although not one of those which took part in the rescue

AT THE SCENE OF THE EPISODE
The little pond which is the home of goldfish and a favorite of damsel flies

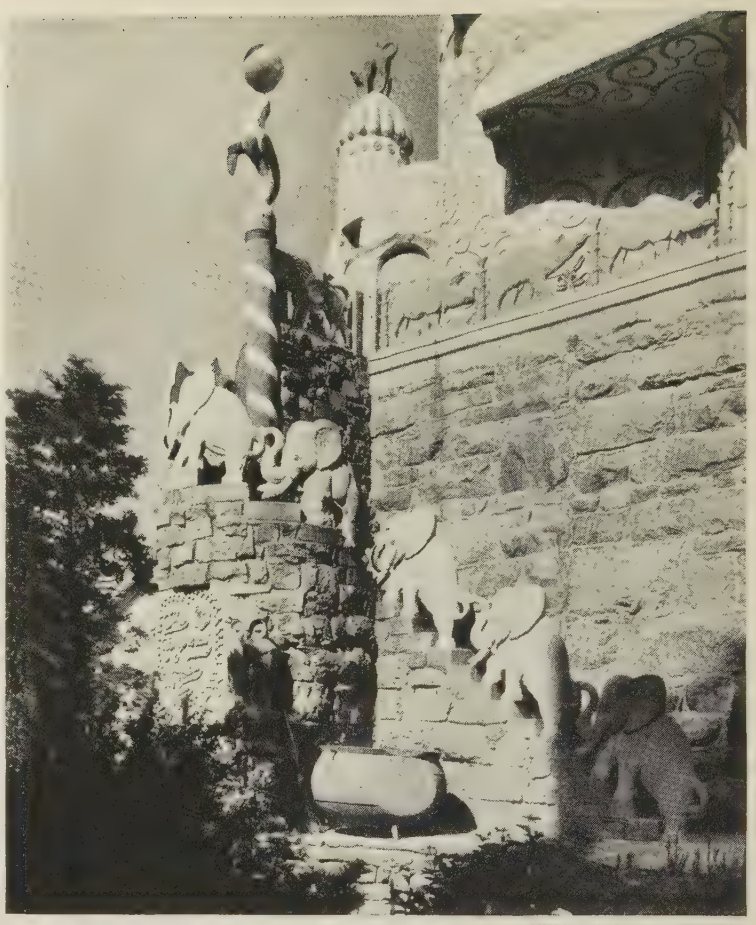
The quickness, bravery, intelligence and expertness of manner of the rescuing couple amazed Mr. Snyder. "Many people believe that insects have little or no intelligence," he said, "but this episode clearly reveals the heights of daring and alertness to which they can rise when the occasion demands. No group of life-savers, trained by the Red Cross, could have proceeded with greater dispatch and efficiency. The damsel fly has not been given a very high intelligence quota in the past; I am compelled to believe, after witnessing yesterday's dramatic happening, that it has been much underrated."

GINGERBREAD CASTLE

BY C. GILBERT NORTON

DO YOU remember how often you wished, as a child, that your beloved Gingerbread Castle, on which Hänsel and Gretel nibbled so ecstatically, could come to life? Now it has! It stands in all the glory of peaked towers, sugar-frosting roofs and candy-cane poles in Hamburg, New Jersey, the product of two years' work on the part of Joseph Urban, the prominent mural painter and decorator who created the setting used in the Metropolitan Opera House for Humperdinck's opera, *Hänsel und Gretel.*

The house was commissioned by F. H. Bennett and stands on the grounds of the Wheatsworth Whole Wheat Products Company in the midst of beautiful gardens peopled with gnomes and elves. One first sees fantastic turrets, the jutting balconies, and the gallant young knight on his piebald steed galloping swiftly into the wind; or perhaps the arching black cat on the ridge-pole.



UNDERWOOD & UNDERWOOD

THE ELEPHANT STAIRCASE AT THE CASTLE

Directly below the seal, balancing on his pole, is the castle's escutcheon, guarded by owls

UNDERWOOD & UNDERWOOD

THE APPROACH TO GINGERBREAD CASTLE

Old fashioned floral beauty gives added interest to this children's paradise. The exterior of the house is done in twelve colors

Entrance is gained either by the outside staircase on which formidable elephants prance, or through a lower portal where the latch is sprung by pressing down on the stuck-out tongue of a grimacing cat. At a turn of the Elephant Staircase a life-size seal balances on the end of a stick of striped candy and juggles a multi-colored ball on its slender nose. Directly below is the castle's name-plate, guarded by two stone owls.

All the famous fairies and beloved book characters are somewhere about, in the mysterious rooms, caves, stairs or passageways—the Three Bears, Goldilocks, the Wolf and Red Riding Hood. Rhinos, anteaters, bisons, owls, rabbits, frogs, geese, dogs, ducks and other citizenry of the out-of-doors form the balconies and the stair railings. On the largest tower, "The Turret of the Giant Spider", a huge spider with glittering eyes crawls up and down a strand of wire by means of an ingenious mechanical device. Truly the decorator has captured Never-Never Land and put it in concrete and steel and stone for youth really to enjoy.

"A CAT-AND-DOG'S LIFE"

BY ETHEL W. MUSGRAVE

PLAYING in the sunshine just outside my window are two baby mountain lions, and a few feet away are two wire-haired terrier puppies. For an hour these four husky animal babies have romped together, chasing one another around and around the small enclosed patio which makes a safe playground for them. Now they are rolling over and over in an indiscriminate heap of white hair and tawny fur with a sprinkling of black spots over all. They don't seem to suspect that there is ever an unfriendly feeling between cats and dogs nor that their own families are deadly enemies; yet the mother of the lion kittens was trailed and treed by a pack of hounds led by a wire-haired terrier, the half-sister of these very puppies.

Like other mountain lions, she had never molested mankind, but she preyed upon his stock, slaughtering a number of valuable calves and colts within two years. In desperation the stockmen declared war upon her, and in due time. Then it was discovered that she was nursing young ones, and a search revealed her den under a huge granite boulder. In it were two angry, spitting kittens about six weeks old.

THE ONLY WAY TO KEEP PEACE
A nursing bottle each had to be supplied the baby lions

Animal orphans have always been able to find sanctuary in our home. It is a sort of asylum for four-legged waifs, so these came to live with us. The kittens were so young that they had to be taught how to nurse a bottle. For more than two days they had received no nourishment and their little tummies were crying for food; but when I approached them with a bottle of warm milk they retreated to the farthest corner of the big box in which I had made a soft bed for them, and there they sat, growling and spitting. They were too small and weak to do any harm although even then the tips of their tiny claws were like needles.

A sniff at the red rubber nipple did not suggest food to them. When I thrust it into Tom's hissing mouth and he got a taste of milk he was wild for more, but to save his life he couldn't get it. The rubber was stiff and hard, and it required so much pressure that he didn't understand and got dreadfully cross about it. His little sister, Tina, was just as hungry and much more willing to learn. Putting the nipple into her mouth I pressed lightly upon her muzzle several times, forcing her to draw in her breath with a sucking motion. She went at it hungrily and gurgled in satisfaction until she had every drop she could hold. It was only an inch of milk from a small nursing bottle like real babies use, but it was a hearty meal for her.

Tom soon learned the trick of being a "bottle baby", and the competition grew keen. In a few weeks they pushed and wrestled continually over the bottle. I saw that some change had to be made. At meal time one of them was shut up in the basement while the other was fed, but the poor little captive paced up and down and back and forth before the door making his strange whistling sound and looking so hungry and angry that I felt sorry for him. Taking a bottle in each hand one day I announced dinner. The kittens were delighted. Each fastened itself to a bottle and they were off on a gurgling marathon. Tom seemed to fear that his sister would get more than he, and Tina, hearing Tom's gulps, sucked for dear life to be sure that she got her share. They didn't stop until they looked like small balloons.

All this time they had been kept in the basement, which, being in Arizona, was warm and dry. They had responded to good treatment by becoming as gentle and as friendly as house cats. When they heard my voice they came running and put their broad paws up against me, looking to see what I had brought. Their first concern was to get food, but after that pleasant duty had been done they wanted to play. They chewed

the toes of my heavy old Oxfords and pulled at the ties, they climbed on my shoulders and tumbled into my lap, they rolled on their backs and put up their paws inviting me to play, and they seemed heartbroken when I finally went away to give attention to household matters.

TERRIER AND MOUNTAIN LION JOIN AT PLAY

They did not seem to know that they should be enemies

One day I opened the basement door and called them up the steps into the sunny patio. Crouching low, one close behind the other, they circled the small yard, staying always near the high wall. Suddenly they spied the two terrier pups that were sitting very still but watching them intently. "As curious as cats", the lions advanced slowly until they were within a few inches of the puppies who crowded closer to the wall. Tom's eyes, big and round and as blue as a baby's, looked into bright brown ones half hidden in a whiskery little face. Each seemed to understand perfectly. They touched noses. Down dropped the puppy's chin on the ground, haunches in air topped by a stubby, wagging tail. Tom, looking very solemn and a little dazed, accepted the invitation by putting a broad paw on top of the lowered head. Like a flash the pup was out from under and the game began.

In a few minutes all four babies were playing like one family. Then the puppies disappeared into their "tunnel". This "tunnel" was a tube or pipe of heavy cardboard about nine inches through and six feet long. It was the most delightful place in the world. A puppy could scramble through it at almost top speed, or, when tired, could go to sleep just inside the round opening from which he might peep if some strange sound should catch his ear. Into this tunnel now went two terriers and two mountain lions. Soon the old tube rolled agitatedly from side to side while from inside issued weird sounds.

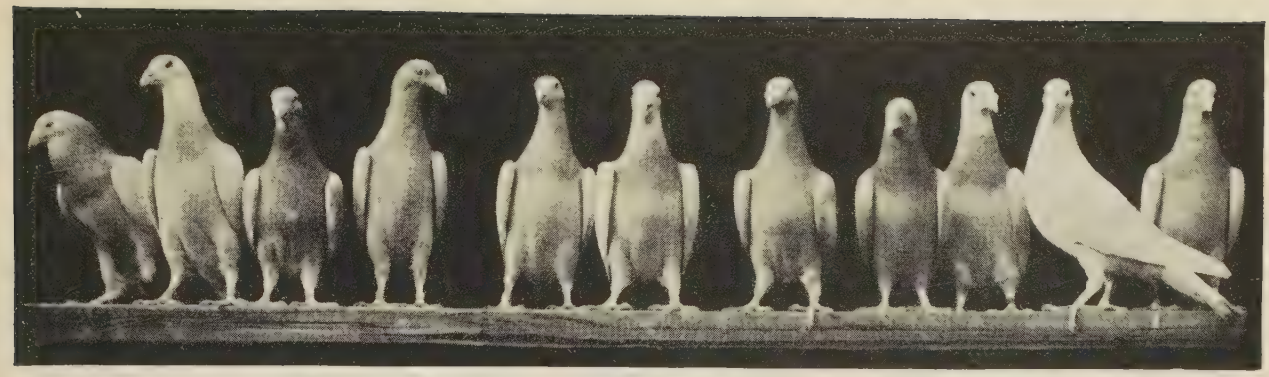
The acquaintance was still new, and I remembered that a grown lion would fight fiercely in close quarters. If the young ones did the same and started it, the battle might be as fatal as the famous one between the gingham dog and the calico cat, for no terrier can comprehend fear. I grew nervous, expecting to have to turn the tube on end and shake out the fragments. But in a moment here they came, some head first, others tail first, all slightly rumpled but happy. Soon they were curled up in one heap fast asleep.

When bottle time next came the kittens drank eagerly while the puppies sat by and looked on hungrily. They tried to nose in, but friendship had temporarily ceased and the lions slapped out savagely with claws set, keeping them away until the meal was finished. There still remained more than an inch of milk in each bottle. I offered it to the pups and they licked greedily at the glass. Then they found the nippled ends, but even though they had been weaned but a short time ago they had forgotten how to suck. They chewed on the odorous rubber and occasionally succeeded in extracting a few tasty drops. The kittens came back for more and the bottle was again passed around among the genial crowd of tipplers.

Sitting back in great contentment after the bottle was finally put away four small animal babies looked up at me as if to say: "It's not half bad—this cat-and-dog's life!"

How long will this strange friendship last, we wonder?

Many of us, for one reason and another, are not able to decide on our vacation plans until a comparatively short time before vacation time is upon us. As this issue of Nature Magazine goes to press there is still opportunity to join one of the American Nature Association's Vagabond parties on the trails of the West. This is specially true of the groups leaving late in July for Glacier, Yellowstone, Yosemite, Bryce, Zion and the Grand Canyon. All the parties are limited to twenty members, however, and those who find that they can plan on one of these unique vacation experiences should not delay in getting in touch with the Director of Field Trips, American Nature Association, Washington, D. C. The trips are described in a booklet entitled "On Western Trails".



A GROUP OF FRANK R. DUTTON'S PRIZE-WINNING PIGEONS

It takes real patience and persuasion to get such a group in such a pose, making this an unusual picture not often to be duplicated

HOMERS AS A HOBBY

DENVER HOTEL MAN FINDS JOY IN RACING PIGEONS

BY NELMA GRAF

This story is the fifth in our series of Nature Hobby articles devoted to the spare-time Nature interests of men and women

HOMER pigeons as a hobby, according to Frank R. Dutton, Denver, Colorado, hotel man, provide a fascinating outdoor sport which drives away the cares of hotel management. Normally a quiet, even reticent man with a pleasing personality and friendliness, Mr. Dutton will always talk about his pigeons. As a boy he loved fine stock—the best in animal life. Then he went into the hotel business, and you can't keep thoroughbred horses or cattle, or a kennel of dogs, in a hotel. But birds—there was an idea! Why not a pigeon loft on top of a hotel? A pent house for thoroughbred pigeons!

So, on the roof of his hotel, Frank Dutton established his racers. This pent house became the home of the Silverton Champions, now nationally famous, particularly for the exploits of Champion Dunbar. This bird won the championship of the United States and Canada for the best 1928-hatched racing homer of either sex or any color, at the 1929 national show. Dunbar carried off the honors against more than three thousand competitors, and added another prize to the many already won by Mr. Dutton.

"Of course," Mr. Dutton says, "the most fascinating thing about pigeons is their home instinct. They can't sing, but their whole life is a song of home, and it is this instinct that brings them straight over many miles to their own loft. Racing pigeons is something the general public knows little about and often misunderstands.

"Racing birds are trained from babyhood. When pigeons are about two months old, we take them from their home loft and put them in the air. This is done every day for two or three weeks. The pigeons will circle about the hotel for awhile, then alight on their own roof. They become oriented to their home surroundings.

"Next we take them out about a mile and liberate them. If they are true homers they fly home immediately. In a few days it is two miles; then five, ten, twenty and on up to the time when they are ready for a hundred-mile flight.

"Before a pigeon is taken far from home he is taught to trap himself; that is, walk through a box equipped with little aluminum bars which, when pressed by the body of the pigeon, fly open. The bird enters and the bars fall back into place, trapping the bird.

"In racing, it is necessary that the bird immediately trap himself so that the waiting attendant may take him from the trap, remove his leg band number and put it in a clock machine and press a slab which records the number and time the bird arrived. If a bird arrives and perches on the roof refusing to go in the trap, his time cannot be recorded and a slower bird quick to trap will win the race.

"After the pigeons come home from a seventy-five-mile trip, we are ready to race them. They are turned over to a Racing Committee. A member puts secret leg bands on them. They are sent to a certain destination, say one hundred miles away, where someone is instructed to liberate them at a certain time and the race is on. Lofts of various birds are logged so that time credit is given for ones farther away.

"Liberated, the birds fly straight up in the air a few feet then begin circling to get their bearings. Each circle grows wider. When the bird gets its bearings it makes a bee line for home. As a rule, the birds stay together until they near home when each flock separates and heads for its own loft.

"There is a prevalent misunderstanding in regard to racing pigeons. Many people believe the birds are starved before they are liberated, and therefore fly home for food.

This is not true. Cups for water and food are kept full on the birds' journey to the starting place. Instinct, not hunger, brings them home.

"Their speed flight is from twenty-five to fifty miles an hour, and in some cases from fifty to seventy-five. An extra good bird will sometimes make one hundred miles. Naturally, as the distance covered gets greater, the speed diminishes, but even on a five-hundred-mile trek a good bird will average from twenty-five to forty miles. On a one-thousand-mile flight the average is twenty-five miles an hour. Two thousand miles is about as long a flight as a bird can make, and it takes a good homer to accomplish this."

READY TO CLOCK TWO HOMERS

Mr. Dutton will remove the leg bands, insert them in the "clock" and press a lever, automatically recording the birds' racing numbers and time of their arrival

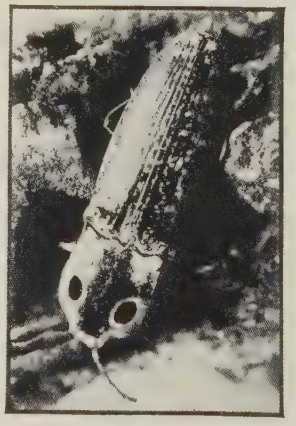
The birds have a genuine affection for Mr. Dutton. One little hen is so tame she will perch on his hand and scold, talk and coo in real pigeon language.

Mr. Dutton always closes a talk about pigeons with the words, "If a homer should flutter into your yard, wounded or exhausted, do care for it. It can always be traced by its leg band number, through the American Racing Pigeon Union at Fall River, Massachusetts. It may be a champion in bad luck on a long flight. All these little fellows are so loyal to home, it is doing a real and much appreciated kindness to assist one to get there."

HOW A BEETLE FOOLS HIS FOES

HE CAN THROW HIMSELF HIGH IN THE AIR

BY EDWARD CREUTZ



HIS GREAT "EYE"-SPOTS GLEAM

And white marks on his body serve as protective coloration

THE Owl Beetle, *Alaus oculatus,* is the largest of the snapping beetles or Elateridae and is therefore sometimes called the eyed elater. Specimens are often an inch and one-half in length.

The conspicuous black "eye"-spots rimmed with white may possibly tend to caution hungry birds that would mistake them for the eyes of the snake, as it has been suggested the similar spots on the larvae of sphinx moths and the wings of our giant silkworms may do, for they are certainly the most striking feature of this insect.

Like the other snapping beetles, *Alaus oculatus* has a powerful arrangement by means of which it can throw itself several times its length into the air, thus righting itself when it is on its back and perhaps escaping dangers from which its legs or wings would not remove it suddenly enough. On the back of the metathorax is a stout spine which projects back into a socket in the abdomen. By bending the head and thorax back, the spine is raised and caused to rest on the edge of the socket. Then with a sudden exertion the spine is slipped off the edge and into the cavity causing a powerful impact.

The photograph of the beetle on a piece of decaying wood shows how its fine white markings serve as protective coloration.

WHEN SOUTHEAST ALASKA BLOOMS

SOME OF THE FLOWERS OF THE SOUTHERN COAST

BY ELLIOT L. FISHER

"Uncle Sam's Icebox"—by this title is Alaska known to many Americans who have little conception of winter on the southern coast of this country added to the United States sixty years ago. Stories are heard every day of business houses refusing to make shipments to Alaska during the winter months owing to "navigation being closed,"—this despite the fact that winter transportation even in the interior along the Yukon River and in the Bering Sea region is merely slowed down.

Imagine a land where green grass shows itself all winter, where roses bloom outdoors many seasons until Christmas, where English daisies and primroses are seen in January; where crocuses appear in March. Does the picture suggest arctic ice and fathomless drifts of snow? Yet it is an accurate portrayal of the climate of the thousands of miles of coastline stretching from British Columbia to the Aleutian Islands wherein lives the bulk of Alaskan population. During the winter of 1926-27 not an inch of snow fell, but heavy rains supplied, some months, a total of thirty inches of water.

In such a climate it is only to be expected that rich flower growth will usher in the spring. The very first blossom to make its yearly début is the red huckleberry, which appears about April 5. The waxy pink and white bells, almost the shape of the berry, arrive before the leaves, and are decorative. Their nectar is food for the hummingbirds that pass through in late April by the dozens on their way north, and their berries are well known from Oregon to the Aleutians. The fruit is tart, of a delicious flavor and resembles in color the garden currant of household fame.

EARLY FLOWER OF SPRING

The skunk cabbage, or "Alaskan lily", is the most distinctive spring bloomer

Our most spectacular spring flower is the skunk cabbage, *Lysichiton camtschtensis*—The Alaska lily. It is the most decorative of all the early bloomers, but unfortunately its well-known and ridiculed odor precludes its use as a cut flower. For more than a month these really beautiful yellow shell-shaped spathes that grow seven or eight inches long and shelter the spike of greenish yellow florets, add a striking tone of color to the woods. The plants often grow two feet high and are quite similar to their cousin, the calla lily. Those who have never seen any but the common green or wine-colored skunk cabbage of the east can have no conception of the beauty of these great yellow lilies, and tourists from the steamers, wandering ashore for a few hours, often gather the blooms and carry them to their staterooms, to their later great discomfort. The Alaska species, in contrast to the character of its "States" relative, must be tender and sweet, for the blossom, appearing before the leaves as a yellow shoot similar to asparagus, is the favorite food of both deer and bear. Bruin digs the shoot out and the deer daintily nips it off just above the soil.

Another April product is the white marsh marigold, *Caltha leptosepala,* a handsome white flower sometimes as large as a silver dollar. Its foliage is like that of the familiar yellow cowslip and grows in much the same manner; the root is thick, irregular and quite like wild ginseng.

An early May bloom is the johnny-jump-up or yellow violet, *Viola pedunculata,* of varied habitat and likely to be found almost anywhere. About the same time that Johnny appears, the small shooting star, *Dodecatheon clevelandi,* is found along the coast.

A BED OF CLINTONIA
The lily-like blooms of this plant carpet many groves in the deep woods

The habitat of this plant extends from the beach, where it flowers in May, to the mountain tops, where the blooms are three months late. Its orchid-like blossom reminds one somewhat of the *Arethusa;* its petals are a delicate pink, with orange at the base and at the point of the asteroid; the stamens are deep purple streaked with cream. It has a close relative on our western plains.

THE JOHNNY-JUMP-UP
It has a varied habitat and comes in May to lend its yellow petals to the Alaskan landscape

When May is nearly at an end, the dwarf dogwood, sometimes called the dwarf cornel or bunch-berry, and scientifically labelled *Cornus canadensis,* begins to form its blossoms. These are at first green, but later the bracts turn white and the florets form a lavender and white rosette in the center. This plant almost covers the ground in some localities—it surrounds old stump bases and loves moss-covered rotten logs. About three months later every plant shows a cluster of bright red berries, pleasant to the taste and a favorite food of the birds.

At this time we also find the wild lily-of-the-valley, *Unifolium dilatatum.* The glossy foliage of this plant, with its feathery cluster of florets, is found from the Atlantic to the Pacific, and literally forms a carpet on the rocky knolls close to the shores. It is one of the few Alaskan flowers having a sweet odor. Like the bunch-berry, the green buds of this flower are in evidence for more than two weeks before fully opening, and it bears a cluster of purplish pink and spotted berries, which are food for the feathered folk, although quite peppery to the human taste. Perhaps the birds consider them as a relish as we do our condiments.

Early June is the usual time of appearance of arctic cinquefoil, *Potentilla emarginata,* the most beautiful and interesting of the cinquefoils. It grows mostly in rock crevices and its downy, gray-green leaves suggest the strawberry plant; the beautiful blossoms are an inch or more in diameter and of a lemon yellow that shades to deep

orange in the center. It is one of Alaska's choice blooms.

Another odd and striking early June flower common to this country is whorled riceroot, *Fritillaria camtschatcensis,* distinguished from other fritillarias by the leaves occurring in whorls. The root system forms a cluster of bulblets like rice kernels, often used by the Indians as food. The blossoms occur in clusters of three to ten at the tops of stalks that vary in height from one to three feet. They are from one to two inches in diameter, a brownish red, striped with yellow, and have a most disagreeable and penetrating odor; they are found mostly in marshes on either salt or fresh water.

White clintonia, *Clintonia uniflora,* is another spectacular plant and forms great beds of beautiful lily-like white blooms, usually in the deep woods. Yellow pond lily, *Nymphaea polysepala,* also comes in June, and is like the common yellow lily found in the States, but lacks its pungent odor. The seeds are said to be used for food by the Indians. Another food berry is the salal, *Gaultheria shallon,* found along the coast in the northwestern United States, British Columbia and southeastern Alaska—a low evergreen shrub with pink and white flowers like blueberry blossoms. These later bear an edible indigo-blue berry about the size of a cranberry, which is a food for many varieties of wild life. It has sometimes saved lost persons from starvation. The berries remain in good condition on the plants until midwinter.

USED AS FOOD BY THE INDIANS

The whorled riceroot, a June bloom, has edible bulblets for roots

AN APRIL FLOWER

The white marsh marigold with its large blossoms

Fireweed, *Epilobium angustifolium,* two to ten feet high, is found on our roadsides in July, and follows its

THE ARCTIC CINQUEFOIL COMES IN EARLY JUNE

It grows in rock crevices, and presents its inch-wide lemon yellow blossoms amid downy, gray-green leaves

usual propensity for burned-over areas. In the interior of Alaska it occurs in solid patches sometimes ten miles or more across. Another roadside flower is the showy foxglove, *Digitalis purpurea,* of varying shades, often ten feet and more in height, which is common all over southeastern Alaska. Although an escaped garden plant it seems to have found ideal conditions in this moist, cool climate, and grows profusely to unusual size in the wild.

While the remark is often heard that southeastern Alaska has few flowers, the writer has observed about seventy varieties without any special effort. With August, the summer flowers have nearly all bloomed and seeded; the only specimens found during that month were closed gentian, mountain harebell, water willow, and hardhack or steeple-bush. There are no fall flowers, so to speak, for often September is much like a winter month with heavy rains that precipitate as snow on the mountains. and as will be noted most of our flowers mature in the three months of April, May and June at sea level, or June, July and August at mountain elevations.

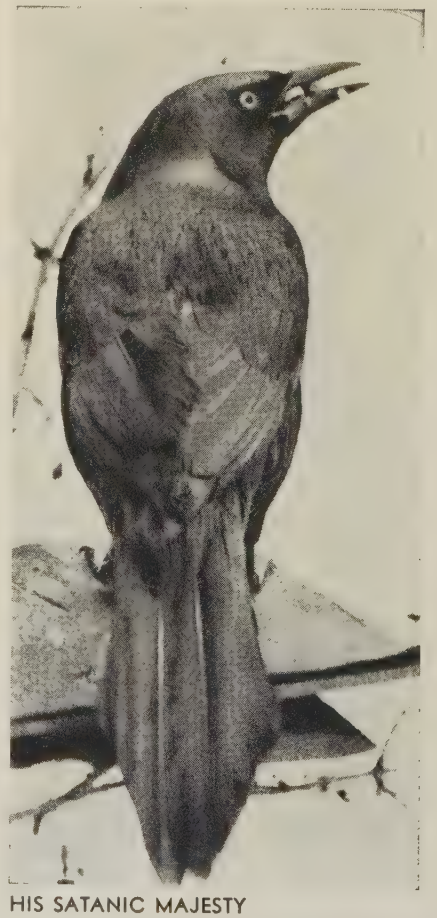
THE BRONZED GRACKLE

BY LOUISE GLEASON

It is March when the grackles whirl in from the South with noisy squeakings—a band of black rovers who take life seriously in spite of their freebooter ways of swarming over grass and trees and helping themselves to plain food and dainties. No sooner do they alight than they stalk around the lawn hunting grubs, their gloomy plumage in keeping with their joyless voices.

Their sedate manner of walking, their size and coloring, remind one of crows, and from that similarity has come the common name of "crow blackbird". Early ornithologists made no distinction between the three grackles—the purple, bronzed and Florida—that are now recognized as differing somewhat in structural features.

It was from the tall maple at the corner of the house that one curious fellow, this spring, eyed the feeding shelf at a third floor window and swooped upon it. His dress proclaimed him a bronzed grackle, *Quiscalus quiscula aeneus.* His black head and neck shone in the morning light as a maze of blue, purple and green reflections. In sharp contrast to the rich coloring of the head were the brassy sheen of his black back and the purple tinge of black wings and tail. He peered at the window blind with a glassy, yellow eye, wary and suspicious of the click of the camera shutter, yet loath to leave. With strong, pointed bill he picked out a sunflower seed and swiftly cracked it, standing ready for flight at the first alarm at the edge of the shelf. The pose gave a good view of his long tail with its somewhat pointed end. When in flight the grackles hold the sides of the tail turned up to form a keel which helps in steering a course. From this habit a southern member of the family gets his name of boat-tailed grackle.



HIS SATANIC MAJESTY
"With strong pointed bill he picked out a sun-flower seed and swiftly cracked it"

With the approach of nesting time the grackles leave the lawn and feeding shelf. They nest almost always in trees and at some distance from the ground, often in communities. Their favorite place is in the bushy tops of evergreens. The nest is quite bulky, made of weed stalks and coarse grasses and lined with finer grass and other vegetable material. They raise one brood numbering from four to six and are most devoted to their offspring until the latter can care for themselves. Having finished the job of raising a family, they gather into large flocks and scour the country.

The grackle's good deeds are many but too widely distributed to be readily recognized. To his credit is the destruction of countless numbers of cutworms, caterpillars, gipsy and brown-tailed moths, grasshoppers, and even some small animal life as mice and lizards. Examination of the stomach contents of grackles by the United States Biological Survey has revealed that economically the grackle is of real value, although many farmers consider him a pest and persecute him along with the crow and the red-winged blackbird.

REINDEER—*Rangifer tarandus*

REINDEER

These are the domesticated descendants of the caribou of the Arctic regions of the Old World. Under domestication they give milk and meat, serve as beasts of burden, and provide means of transportation by drawing sleds. The natives take excellent care of their herds, moving from place to place with them so that food may be had. They become gentle and easy to handle. The male and female both have long equally branched antlers. Their hoofs are admirably adapted to travel over the snowfields. In the wild, reindeer migrate in large herds from one tundra feeding ground to another, where they subsist on grasses and the northern cladonia, a lichen usually called reindeer moss. These European reindeer have been brought to Alaska and Labrador and are proving of great value to the natives and white people as well. Reindeer meat is now regularly sold in the markets of the west. Among the nomadic tribes of Arctic Siberia a man's wealth is reckoned by the number of reindeer he owns, for these form the chief support of the people. Usually there is a single calf born some time in June.

BLACK-TAILED DEER

These animals are limited to the Pacific Coast, inhabiting he densely humid coast mountains from Alaska to central California. Here they live among the rank growth of tall erns and other plants that cover the forest floor. They are imilar to mule deer, having the same type of branching ntlers and large ears, but they are of a smaller size. The listinguishing feature is the entirely black tail. When the does retire to a secluded glen to raise their two or three potted young, the coat is reddish-brown, but when the anmals come together again in the autumn their coats have hanged to the tawny, grayish-brown of winter. Their favrite food is the tender leaves and twigs of evergreens, especially salal, huckleberry, spruce, Douglas fir and juniper. The males lose their antlers in early spring. They then move nto the brush-covered uplands while their new antlers attain full growth. These deer feed and travel about at night, esting during the daylight hours in some well sheltered pot. The limited habitat of this species makes it necessary o give adequate protection in order to prevent extinction.

BLACK-TAILED DEER—*Odocoileus columbianus*

VIRGINIA, OR WHITE-TAILED DEER—*Odocoileus virginianus*

VIRGINIA DEER

In May or June the rusty-red doe appears with her new children, usually two in number, and they remain together until autumn. The fawns are duller in color, marked with large white spots which remain until the whole family put on their winter coats of brownish gray. These deer, together with closely allied species, are found all over eastern North America, west to the Great Plains and lower parts of the western country. They are inhabitants of the forest. When alarmed the shy creatures are gone in a flash, with their white tails held erect, as a signal to any of their kind that danger is near. This species has been of inestimable value in the settlement of our country, for they were a very important source of palatable food to the pioneer. They have held their own and increased when they have been given even a modicum of protection. Their food is like that of all deer, the leaves and buds of shrubs and small trees. In winter they gather in a sheltered spot and keep paths beaten through the snow to the food supply, extending these as their destruction of the shrubbery progresses.

ROCKY MOUNTAIN GOAT—*Oreamnos montanus*

ROCKY MOUNTAIN GOATS

Rocky Mountain goats find their meager, though adequate, living among the almost inaccessible crags of the mountain heights, from Alaska into northern United States, and frequently down their western sides toward the sea. Their thick, woolly coats protect them from the extreme cold, and their sureness of foot takes them far from enemies below, so they have little to fear except an occasional eagle which may swoop down upon the young. Their sharp horns and agility usually protect them from these, but if the birds attack in pairs they sometimes capture a kid. These goats add an element of picturesqueness and anticipation to our mountain parks where travellers are keen to see these wee white creatures following invisible trails and springing lightly from point to point so far above on seemingly perpendicular walls. Their small sharp-edged hoofs are generously padded with rubbery material which does not easily slip, enabling them to cross the most slippery of snow fields and icy rocks. Many alpine plants grow in the small crevices of rocks and on alpine meadows; on these the goats subsist.

MOOSE

This is the largest of our land mammals. His curious head with its large, odd nose, the broad, palmated antlers, and the pendant "bell" below the throat, all combine to make him seem like a story-book animal. Because of his long legs he is taller than a horse. Though large and heavy, he is able to travel almost noiselessly through his northern home in the thickets of alder, birch, tamarack, along the edges of slow-moving streams and shallow lakes. He is fond of water plants, leaf, stem and root. These delicacies he seeks at night during the season when his antlers are growing and the calves are young. He is sometimes completely covered by water when he reaches for food at the bottom. He is naturally a shy creature until he is ready to seek his mate; then his trumpeting call means challenge to all intruders, and, in his conflicts, he uses his strong fore feet as well as his heavy antlers. He is found in the forest areas of northern North America as far south as Maine, Minnesota and Wyoming, and under protection he may continue to occupy these areas for many years in the future.

MOOSE—*Alces americanus*

PRONGHORNED ANTELOPE—*Antilocapra americana*

ANTELOPE

Pioneers seeking the west found thousands of these animals ranging over the Great Plains and the deserts from Canada south to the Valley of Mexico, and eastward through what is now Nebraska. Antelope require large areas of wide, open country to thrive. This has been growing less with the advance of civilization until now there are only a few small herds left in widely scattered territory. Possessed of an exaggerated sense of curiosity, they habitually place themselves in unnecessary danger, evidently depending upon their fleetness of foot to escape. When startled, they raise the stiff white hairs of the rump patch. This conspicuous signal is visible for a couple of miles and is passed from group to group until all have taken alarm. The larger herds which travel together during the winter separate into smaller ones in the spring before the young are born. They feed on green leaves and buds of shrubs and bushes as well as many of the grasses which abound in their native haunts. Able to leap many feet on the level, a perpendicular rise of four feet, as of a fence or rim-rock, completely baffles them.

ROCKY MOUNTAIN SHEEP

This species and its relatives, sure-footed inhabitants of the Rocky Mountains from British Columbia to Colorado and New Mexico, spend their summers in the rugged heights at the edge and above timberline. Here in early spring their lambs are born. They feed on the scanty vegetation of the heights and grow strong and agile like their parents, able to bound up or down rocky mountain sides where a misstep would be fatal. The flock descends to lower country when the heavy snows of winter come. The southern species inhabit the treeless desert areas where the vegetation is largely cactus and like thorny plants. These sheep, which have long been considered the finest prize of the hunter, have become rarer where not protected; for they have other enemies than man. The eagles take their toll of lambs in the summer and in winter the mountain lion and other carnivores sometimes kill the adults. Where given protection and food during the winter these sheep become very tame. The flock at Banff, a good example of their acceptance of man's bounty, may be enjoyed by winter visitors.

ROCKY MOUNTAIN SHEEP—*Ovis canadensis*

WAPITI, OR AMERICAN ELK—*Cervus canadensis*

ELK

When our country was first settled these great animals ranged over the western plains and much of the eastern states, but they were gradually killed off or driven to take refuge in the foothills and mountains. They now summer in high altitudes, in forest and alpine meadows where they feed on succulent grasses and the tender leaves of herbs and trees, returning to the lower country only when the snows of winter make life at high altitudes impossible for them. The largest herds of them now summer in Yellowstone Park, Wyoming, and the Jackson Hole country shelters and feeds many of them during the winter months. It is unfortunate that early settlers called this animal the elk. It is the counterpart of the European red deer and is the finest looking of our American deer. In late summer and early fall the bugling of the males may be heard as they wander through the upland forests defending their rights over the herd which is theirs. The fine antlers and light rump are unmistakable field marks. The spotted young, usually only one, although twins occasionally occur, are born in May or June.

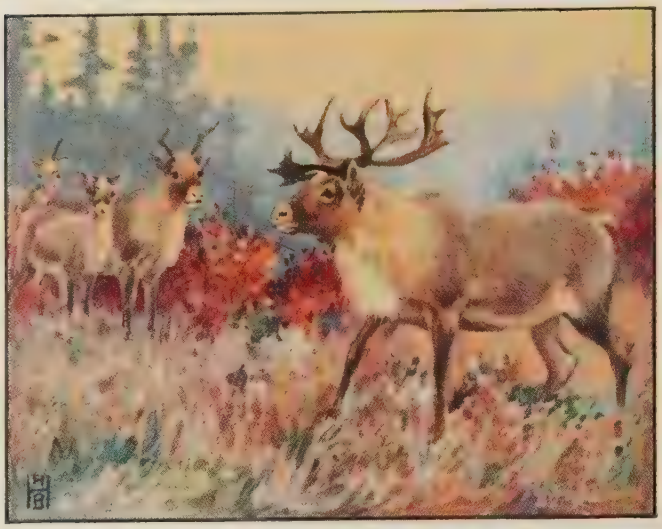
BUFFALO

Formerly great herds of this picturesque animal roamed over the entire inland areas of North America from Canada almost to the Gulf coast. Tree-covered lands as well as the western plains country were alike home to them. The calves are born in May or June. During their first week they are unable to walk well and at this time in the wilds they often fell prey to wolves. The Cow could protect them from one or two of these animals but called for help when the pack threatened. The Bulls would form a circle about the calf and gradually lead it to the protection of the main herd—moving a few feet at a time. The wolf pack followed until sure they had lost their feast. Besides the depredations of wolves the buffalo herds suffered from blizzards, softened ice on streams, quicksands, and prairie fires, all of which took high toll every year. In the early eighteen-nineties there were less than one thousand left, but under protection these now number several thousand. Two main groups are on original range, one in Yellowstone National Park, the other in central Canada; some are kept in Zoological parks.

BUFFALO—*Bison bison*

WOODLAND CARIBOU

Among the spruce, birch and alder of our northern forest, this animal of ancient lineage is striving to hold a precarious existence. Its range is from British Columbia to eastern Canada and past the borders of a few of our northern states; and, since it is not keen at sensing danger, it has been unable to cope with man and his weapons. The stags, in their prime, are stately creatures, but when the antlers are shed they seem awkward. The young, usually one, but sometimes twins, are born in June. During the summer, the calves and their mothers browse together in small groups, while the males betake themselves to distant woodlands, and are often observed near the shores of forest-bordered inland lakes. The favorite food is the lichen commonly known as reindeer moss, and Old Man's Beard, a species that grows on trees and is eaten when snow covers the ground. Their more numerous cousin, the Barren Ground Caribou, is a closer relative of the Reindeer of the Old World. Unlike other members of the deer tribe, both sexes have horns, but those of the female are the more slender.



Woodland Caribou—*Rangifer caribou*

Musk-ox—*Ovibos moschatus*

MUSK-OX

This is evidently an animal of a former age which has persisted in the bleakest, most unpromising part of our globe. Fossil remains show that they formerly inhabited the northern part of the Old World. During the past century they have become extinct in northern Alaska. Now their range is the barren lands of Canada, west of Hudson Bay, the islands of the Arctic Ocean, and the northern coast of Greenland, where the brief growing period provides a limited amount of fresh lichen and moss which is their favorite food. A single calf is born in spring. The long hair which reaches nearly to the ground gives them a heavy-bodied appearance and the massive horns indicate added weight; nevertheless, they climb steep, rocky slopes with apparent ease and swiftness. Their chief enemies are wolves and man with his dogs. When assailed, they form a circle, heads out and lowered, with the young within, and thus they present an impenetrable wall of sharp horns. In spite of their hardiness and courage the race seems doomed, as they have no means of defence against the modern rifle.

MULE DEER

This deer is at home in wild, rough country of the plains, foothills and mountains from the Mexican tableland to British Columbia, and west to the coast of southern California. The large size of the ears and the curious antics when disturbed suggested their name. The antlers are doubly forked. In the early spring the red-brown does leave the bands with which they have spent the winter and choose secluded canyons or wooded glades where their one to three fawns are born. These handsome, spotted youngsters remain with their mothers during the summer. In the meantime, the males keep together in groups of six or eight while their horns are in the velvet. When the velvet is shed their new gray-brown coats are in perfection. After the mating season they come together in herds of eighteen to twenty and spend the winter in country where they can elude pursuers by bounding swiftly over rocks and up grade out of reach. There are several types of these deer, with similar habits, found under the varied conditions of climate and cover in the wide area inhabited by the species.

Mule Deer—*Odocoileus hemionus*

A FAMILY SCENE ON GREAT DUCK ISLAND

ALL PHOTOGRAPHS BY THE AUTHOR

THE GULLS OF GREAT DUCK

BY OLIN S. PETTINGILL, JR.

SHIPS that pass through the fog far out from the coast of Bar Harbor, Maine, heed the warnings of the tri-horn on Great Duck Island. The farther they are away from its regulated blasts the safer their captains feel. But the smaller boats cruising along its shore have little to fear. There are no outlying reefs and the ledges that form the little island rise abruptly from the sea. Once the shore line is visible through the thickening mists the shrill cries of a thousand gulls are heard above the roar and pound of the surf from the open Atlantic.

HOW THE HERRING GULL LOOKS WHEN HALF GROWN
At this stage between downy chick and the sleek whiteness of adult it looks like another species

When finally the mists lift, the rugged shore can be seen against a background of green vegetation. Spruce trees in abundance cover the center of the narrow island. The rest is grass-grown, the feeding ground of flocks of sheep during the summer months. Except for the lighthouse on the southernmost point, man has made but little impression. This is the home land of the herring gull and here it holds sway.

The visitor forgets all about viewing the scenery of the Maine coast once he is on the island. The gulls see to that! He immediately finds these birds—known about our harbors as extremely graceful on wing and quiet spoken—only too eager to prevent the intrusion into their homes. His arrival is greeted with an airful of threatening screams and squawks. It seems, when we wander about the island, that the few thousand birds present each take a turn at attacking him. This is due, no doubt, to the fact that he cannot help being in the vicinity of at least several of their simple grass nests. An unexpected swoop above the head, accompanied by a fierce clicking bill and slapping wings, is not an unusual occurrence. Only the gulls in the section of the island where he is present are alarmed, however.

NEST OF THE HERRING GULL
Three eggs are the number usually found in the many nests

From the shelves of the ledges on the shore, from beneath the scrub spruce trees, and from the open parts they rise from their nests. Others, obviously not bound down by domestic cares, shoot off from the tops of the spruce trees which are already flat-topped because of gulls' constant loitering there. Still others launch from the rocks and stumps. If it is in the middle of the summer, downy chicks scamper out of breath for a place to hide. They stumble, turn somersaults, fall off ledges, anything to get out of sight. Their distress notes range from a plaintive peep to a wholesome screech. Once in the air, the parents flutter about nervously. The youngsters continue to hide, but their judgment in picking a hiding place would make any loving parent nervous. If their heads are well concealed under a thistle plant or stuck into a crevice of a rock, they seem to feel safe. Some do not even attempt to hide their heads. Perhaps

they trust that the mottling of their natal down will be sufficient disguise. Once they are touched by the hand, screams and scramblings cannot express their fright. Words cannot express, also, the uneasiness of the human with a couple of devoted gull parents diving at him from above!

In order to observe the herring gull as it normally exists, one must conceal himself as well as possible. This is best accomplished by the use of a blind where the observer may see and not be seen. If hidden in the middle of one of these thickly inhabited sections, the onlooker can watch the domestic routine of a few hundred families. Each family, in fact, is not unlike a ring in a circus with each member occupied with some personal, domestic, or public endeavor. The observer may be discouraged at first because the gulls fail to quiet down when he has entered the blind. This difficulty may be avoided by having another person go along with him as far as the entrance and then suddenly depart. The loss of one person is of little consequence to the gulls. Wise as they are, they are poor mathematicians!

HERRING GULL GIVES VENT TO NOISE IN VARIETY

Its calls can hardly be described as musical but they all serve a definite and expressive purpose

Once settled within the blind the observer will find gull community spirit anything but harmonious. While one pair is concerned with incubation, the two next door are seriously engaged in bringing their chicks through the first few days of life. What makes matters even worse is the fact that several other families are well along in their nesting activities and the brood is going through that flightless, wandering stage. The result is that some pin-feathered stripling succeeds in bothering a couple of adults going through the apparently boresome period of egg incubation or hatching. They apparently are quite irritable; consequently the stripling is severely attacked with bill and claw. The youngster gives vent to his feelings by voice without hesitation, the neighborhood is disturbed momentarily and all the nearby gulls capable of flight take to the air. Nothing further happens except that the young scavenger feels abused and gives up the idea of strolling for a while.

Regardless of human intrusion there is always a

PROFILE OF A GULL CHICK

Like all young birds it is possessed of a hearty appetite

noticeable restlessness in the colony. Gulls seem to be constantly coming and going. Others seem to soar in the breeze for the pure love of flight. With their four feet of wing spread they dip, side slip, mount gradually and then slide backward. The uneasiness is often made manifest by the many notes and calls, some of which have a certain sameness. For instance, sudden alarm seems to be voiced with a series of short *qwa, qwa, qwa* notes. These few sounds, when uttered, arouse the entire vicinity. The shriller cries, one of which is similar to that of one of our hawks, do not necessarily indicate danger. The most outstanding of all, however, is the "scream call". When giving this the bird will extend its neck to full length in direct line with the body, thus acquiring a position in which to emit a succession of intensely piercing *ky-eeee, ky-eeee* calls. The mandibles of the bill are thrown widely apart as in a yawn. The calls seem to be as spontaneous in origin as the crow of the rooster and are often given while on wing. There are also notes used in more intimate circles, such as the family. In this case the birds will direct their bills downward and immediately upward and over the back, uttering at the same time a soft *pa-weeee* note.

JUST OUT OF ITS SPECKLED EGG

The other two eggs are still in a process of hatching. Soon three mouths to fill

A number of our common birds, including the herring gull, have an interesting method of feeding their young. Instead of securing their food and carrying it in their bill as do our song birds, they swallow it. Once at their nest or in the vicinity where the brood is located, a so-called regurgitation process follows. The young, meanwhile, are well acquainted with what seems to them the place of origin and start pecking at the parent's bill. The latter takes on a distressed appearance and shortly brings forth the meal, consisting very often of squid. Sometimes the parent has little difficulty while at other times it is quite a struggle. The chicks do not wait for service, once the food is before them. Tugs of war over a choice morsel are not infrequent. With the hooked upper mandible the parent assists by tearing apart the larger pieces. If, perchance, any sort of danger signal should be heard among the colonizers, the adult will re-swallow every particle of the meal before taking wing. There is to be no waste of the precious food in spite of danger!

How all the gulls gathered in this small locality can secure enough food to survive would seem a question. To be sure, the major part must be found in places other than on the island. During the day Mt. Desert Rock, fifteen miles farther out to sea, is literally thronged with gulls fishing off its shore. Towards evening, regardless

THE HERRING GULL IN ITS FIRST YEAR PLUMAGE RIDES THE WAVES

Afloat in his element which is as much home to him as the sea-lashed rocks of Great Duck Island where dwell his kind

of fog, they are said to depart almost instantaneously in the direction of the Duck Islands. Lobster fishermen who visit the shores of Great Duck Island in their launches are surrounded by these scavengers, who wait expectantly while they empty their traps. Let another boat sail around the island, similar in size but void of lobster fishermen and equipment, and no attention whatever is paid to it!

At night Great Duck Island becomes another land. Occasional gulls, ghost-like, fly here and there and all of a sudden let loose with a characteristic scream which feigns a different tone. This in a setting of black spruce with the rush of the tide and rollers pounding regularly against the rugged ledges of the shore. If it is stormy, the fog-horn on the government reservation is man's contribution to the picture. With all this innumerable bat-like figures dart about. The swish of their wings can be heard above the roar of the surf. There is a constant twittering and trilling, both in the grass and among the lower boughs of the spruces.

By morning the only evidences of this nocturnal frolic are numerous holes irregularly scattered in the pliable turf. If examined carefully these holes will reveal a burrow approximately the length of a man's arm and relatively the same thickness. At its end a sooty-brown bird with a white rump and forked tail will be found covering a single white egg. Fictitiously it belongs to the brood of Mother Carey, but it is commonly known as Leach's petrel. When brought to light it seems bewildered and seeks darkness by crawling under some overlapping object. If taken into the hand it becomes a bundle of motion. If alarmed it will emit a greenish fluid from the mouth. Swallow-like in contour and about the size of the purple martin, it has a remarkable power of flight and if released from hand by day, it shows hardly a sign of being dazed but flies immediately out over the ocean, rapidly zigzagging its way along.

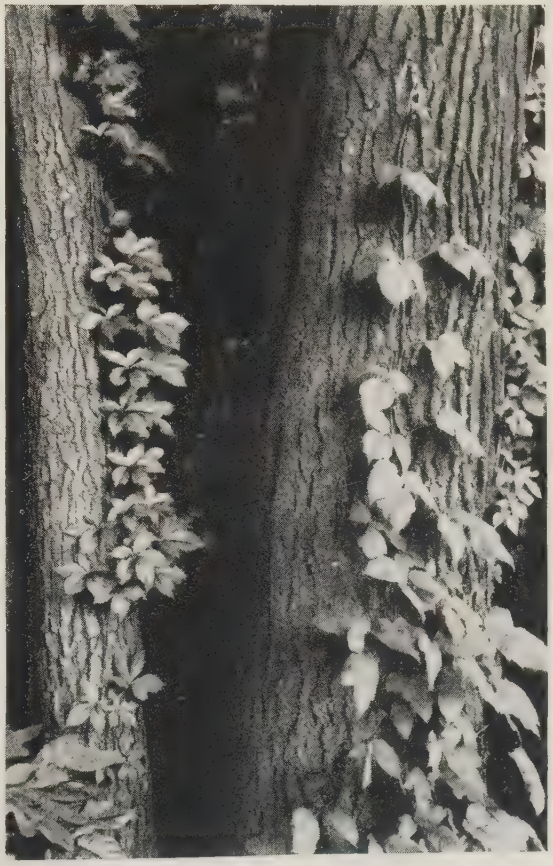
Only during the breeding season are the petrels to be found on land. The remainder of their time is spent at sea where they may be seen by passing ships flying just above the crest of the wave. Someone was imaginative enough to liken them to the Apostle Peter for their apparent ability to walk on the water; thus the derivation of their name "little Peter" or petrel. It is long after sunset when the petrels invade Great Duck Island, either to carry on their courtship antics, to bring relief to their mates guarding the single egg, or to visit the downy youngster who spends the day alone. With the first signs of dawn the nightly frisk is stilled and Great Duck is once again turned over to the awakening herring gull. The day shift that carries on the unending work of Nature rules again on "a stern and rock-bound coast".

THE GOOD AND EVIL

BY C. H. ROBINSON

THE INFECTION of poison ivy is always painful and frequently dangerous, yet despite the well-known disagreeableness of this plant, few are able to recognize it in the woods. There are two varieties, the low shrub and the tree-climber. Both exude from leaves, and perhaps stems, the oily substance that poisons.

The vining variety closely resembles Virginia creeper, a harmless vine often found in the same locality as the ivy, and the similarity frequently causes grief, especially in the fall, when both plants have brilliantly colored leaves that tempt one to gather them for bouquets. There are a number of differences, however, that make them distinguishable. The ivy has but three leaflets on the leaf-stalk, while the creeper has five, much more finely toothed and veined than ivy leaves; the poisoner mounts the tree by many small rootlets issuing from its stem, while the creeper does so with tendrils resembling those of the grape-vine.



IVY AT THE RIGHT—CREEPER AT LEFT
Note the dissimilarity of leaves and stems. Yet the two are often confused, with painful results

If a mistake is made, however, one of the best cures for the watery pimples that connote ivy poisoning is the frequent application of a styptic pencil. The pencil should be dampened and rubbed over the infected skin, but the alum should not be rubbed off. For a bad case benzine is of valuable assistance.

COURTESY N. Y. ZOOLOGICAL SOCIETY

PETER RESTS WITH THE AID OF HIS LENGTHY TAIL

He established a record of longevity for his kind in captivity, living for four years

THE AFRICAN JERBOA

A FASCINATING LITTLE RODENT OF THE DESERT

BY IDA MELLEN

No list of the world's queerest animals would be complete without jerboas. On viewing these singular creatures one wonders whether they are rabbits, rats, squirrels, mice, or dwarf kangaroos. Classed among the myomorphic rodents, the smaller species are not inappropriately called "jumping mice." Other names are "jumping rabbits" and "desert rabbits," and the Arabs are said to call them the *Daman Israel*—Lamb of Israel. They inhabit the deserts of Egypt, Africa and Central Asia principally, and number more than two dozen species, some of which have short limbs of equal length, and climb trees. Several varieties are said to be as large as rabbits.

Many years ago Mrs. Brightwen, in her charming book, *Quiet Hours with Nature,* devoted a short chapter to the first popular account of these animals. Hers were Egyptian jerboas, *Dipus jaculus,* known also as "Siberian jumping rabbits" and resembling closely the African species except for their shorter ears. On escaping from their cage, they proved so fleet that she was able to capture them only with a butterfly net and never afterward permitted them to roam. No foods attracted them except fresh lettuce and dandelion leaves, and sunflower and canary seeds. A youthful reading of her account inspired me with the wish to own jerboas and finally, through the kindness of Dr. Raymond L. Ditmars of the New York Zoological Park, a much treasured pair came into my possession. They were named Peter and Pauline. Although their cage was ready on their arrival, they peered out of the traveling box only momentarily, then rolled up and went off to sleep again, for it was yet day and jerboas reverence daylight as sacred to the God of Slumber. By night it was possible to discover what they looked like and to understand why "jerboa"—meaning strong muscle—is so fitting a name, referring as it does to the power of the hind legs.

In appearance the jerboa is decidedly more pleasing than our American kangaroo rat, and its skeletal structure is not its least interesting feature. The neck vertebrae, for example, are arranged in precisely the same manner as those of the sperm whale! The short fore limbs are five-fingered, while the long hind limbs have three toes, the metatarsals being elongated almost like those of a bird and ankylosed together to form one bone. The long phalanges of the digits alone reach the ground when the animal hops. The anatomy is described at length in the *Cambridge Natural History*—but a jerboa in the hand is worth two in a text book, and the first points to be observed in the living animal are the large, bright eyes, intensely black and full as a squirrel's, the mouth with its typically rodent-like incisors, and the remarkably long ears, whiskers, tail and hind limbs.

When the jerboa is stretched at full length its body measures about six inches, and while the fore limbs are

but an inch long, the hind limbs measure about six inches and the tail nine inches. The whiskers are more than half the length of the body, and the busy little nostrils can be closed to exclude sand while the animal is burrowing. The ears are naked and the hind limbs are likewise bare except for tufts of fur between the toes. The tail has a brush of dark brown and white at the tip. It serves as an extra leg which the animal flexes and on which it balances when in a sitting posture. In color the soft fur is yellowish fawn above and creamy white beneath. Sometimes the jerboa runs with unbelievable speed on its powerful hind limbs, the tail then being carried straight out slightly above the ground. Its movements resemble the flight of a bird, and companies of jerboas, leaping over the sand of the deserts, are readily mistaken for flocks of small birds. At other times the rhythmic hop makes the animal appear as if on stilts.

DR. A. E. THOMSON

PETER AND GIRLIE IN THEIR NEW YORK HOME

Note the rabbit-like ears, the bright, black eyes and the prominent whiskers, all outstanding characteristics

The kangaroo-like fore limbs are more useful than a casual inspection might lead one to conclude, for they not only serve to grasp the food and cup the water but are strong enough to dislodge small stones and support the body when the hind limbs are excavating sand or earth and also when the body reclines. Moreover, they assist materially in the making of the toilet, during which every hair is combed with the wire-like claws of these inconspicuous little limbs and the tail conveyed directly to the mouth for attention.

The jerboa, though having the reputation of being an extremely delicate creature, is probably the healthiest and most exquisitely clean rodent in the world. It is odorless, requiring fresh bedding but once in a fortnight. In a natural state it is said that it harbors parasites like other animals and is rid of these before being shipped from the East. It is fragile, however, so that it seldom survives transportation to the United States. Formerly it was commonly exported to England, but has not been seen there for several years.

Like most tropical creatures, it suffers pitifully from humidity, and in the dripping heat of New York in summer leaves its nest and stretches out on the hay of the cage in such manifest misery as to arouse sorrow. Often I have kept an electric fan running all night to ease the discomfort of my specimens; yet these peculiar desert dwellers will run on the chilly floors of a room in which the temperature is 50° F. and evidence no discomfort even though the hind limbs and tail become very cold!

Their natural home in the deserts is on the outskirts of the oases, where warrens with many intricate galleries are burrowed in the stony soil. Their strong incisors can gnaw through certain kinds of stone and the teeth are continually busy when there is anything to chew upon. My jerboa, Peter, preferred pumice stone, but his last mate, Girlie, likes cork better and chews up yards of it, since the floor of the cage and the nest are always lined with cork tiling.

Dr. Ditmars found that jerboas eat hay and cracked corn. With my specimens lettuce and hemp proved the favorite foods, though hemp is given only sparingly. Sunflower and canary seeds are eagerly accepted, and occasionally grape nuts, grass, hay, petunia leaves, chickweed and radish leaves will be taken. They refuse carrots, bread, nuts and every kind of fruit. Some jerboas are said to be overfond of water and to drink themselves to death, but mine never have touched it when supplied with lettuce. If the lettuce is omitted for a day, they will take a few drops of water, cupping it prettily in their tiny hands.

Despite long ears, which we should expect to indicate keen hearing, the jerboa's sense of sound is not acute, although, like a rabbit, it raps with its hind limbs and may so communicate with its kind. The brain is too poorly developed to enable the animal to make the fullest use of its great eyes, but however busily engaged in making its toilet, it will perceive any object moving within a radius of a dozen feet, and, unless this be one of its own kind, will instinctively retreat. Noises never have dis-

turbed my specimens when asleep except for the sound of a vacuum sweeper that will trouble them even to wakefulness. Perhaps its whistling simulates a storm in the desert.

The jerboa is curious by nature and very determined. It enjoys exploring new places. If a door standing open leads into a closet or room not previously inspected, the little animal's curiosity is overpowering, and if after running once about the new territory it is barred, it will leap up many times against the closed door, its *idée fixe* seeming to be that all obstacles are of height only and may be surmounted. Although so small, it can clear an obstruction two feet high. The maximum weight of the African jerboa is four and one-half ounces.

Some jerboas are temperamental and their feelings may be easily injured. My jerboa, Girlie, persisted in going behind the kitchen range and gnawing the linoleum, and was deeply offended when pushed out with a fly swatter. Such an indignity! Squealing protestingly, she flattened her long ears against her neck just as they are flattened during sleep, and ran about thus until I despaired lest she would carry them through life in such shockingly unbecoming fashion. The jerboa memory is short, however, and in half an hour the rabbit-like appendages stood erect as usual; but to avoid hurting her feelings again, it seemed best to bar her from the kitchen. These animals never bite, but a temperamental one if restrained too long may give one's finger a soft, warning pinch. They seldom grow tame enough to come at call or otherwise, yet are so curious that if a person sits motionless on the floor they will hop all over him. They never become social enough to sit contentedly in the hand, but may remain quietly on the shoulder, in which case the tail must be secured between the fingers, else the jerboa will drop to the ground or spring away through space. They are easily captured by placing one hand under the fore limbs, the other under the hind limbs, and lifting them gently from the floor.

In the evening this strictly nocturnal little animal's instincts differ remarkably from its instincts in the morning. Its concerns on waking up for the night are making its toilet, stretching its muscles, taking running exercises, meeting and touching noses with its fellows, during which an almost imperceptible cavy-like squeak is emitted, and, in the natural state searching for seeds and grasses.

The daily dozen are wonderful to behold and are performed without benefit of radio. After beginning its toilet the jerboa lies on its side, extends the hind limbs first as far back as they will go, then, with a circular sweep, as far forward. Next it springs to its haunches and resumes cleaning its fur, turning so far backward as to reveal the creamy "shirt front." At night it will harm nothing. At the approach of day, however, its sole desire is to burrow and go to sleep, and no matter how hard it begs to be taken from the cage in the morning—begs by leaping up, sometimes simultaneously turning in a circle—our carpets, rugs, cushions, shawls and couch covers are not safe, for the jerboa considers them none too fine to be reduced to their original threads and carried under some piece of furniture for bedding. When marauding, its mouth conveys such huge bunches of the booty that it seems to sport bushy whiskers.

The ideal way, therefore, since jerboas can not live without abundance of exercise, is to permit them to run all night if possible and have them securely back in their cages ere day breaks. Peter, one summer at the seashore, awoke every evening at eight o'clock to enjoy his run on the piazza, where he sat on his haunches before the screen door and sniffed the sea breezes with rare delight; but he was fast asleep by six in the morning. The jerboa takes a few naps during the night, also a few meals during the day, for seed-eaters must eat frequently. When it sallies forth from the nest by day to eat, it does not unfold its ears or open its eyes, but moves sleepily toward the food dish, and having eaten, re-enters the nest with a head-on plunge and sticks its long legs straight up in the air as though to say, "Now for another snooze before we eat again."

Jerboas have never been bred in captivity, though the feat is probably not impossible. They never have been maintained under natural conditions, but only in wire or glass-and-wire cages with hay bedding, and usually in the city. It would be an interesting experiment to place some specimens in spacious quarters with grass and soil and sand; but the young males are inclined to be quarrelsome at night, attacking the old males, with whom they sleep huddled together peacefully enough by day. How long they live in the wild state is not known. Peter, though not a young animal when he came to me, was destined to outlive his first two mates and also to make a record in longevity for jerboas in captivity, surviving nearly four years in my home. As a rule he shed his fur during hot weather and was a sight to behold the first summer—almost as naked as a newborn rabbit, for jerboas do not shed gracefully a little at a time like other animals, but all at once! I was quite ashamed of him, but thereafter overcame this unpleasant habit by applying hair tonic when the shedding began. This seemed both to check the rapid falling of the old fur and to help bring in the new more quickly, and he never again presented such a dismal aspect. The policy was pursued with Girlie from the beginning and her shedding has always been a comfortable one.

Peter once received a thorough wetting. His cage had been left near a northeast window, and a shower came up, so that his bedding was soaked with rain water and he was drenched. In haste I dried him with warm towels and he fell asleep and never suffered any ill effects. Once a pane of glass fell on him, flattening him beneath it. When it was lifted, he ran off undamaged. There are flaws, therefore, in the theory of the "constitutional delicacy" of the jerboa.

These alluring animals, abounding in great numbers in the heart of the deserts of the Old World, form the natural prey of foxes and wildcats, and it is true, too, that for more than fifteen centuries the Arabs have considered them delectable morsels for their elaborate feasts.

THE GARDEN POOL IN THE GLORY OF ITS BLOOM

The main pool where the lilies grow merges naturally with the bog garden, creating an unusual effect

THE GARDENER TAKES TO THE WATER

BY R. W. LINDSLEY

TIME was—and not so long ago—when we thought that pools were only enjoyed by the very wealthy or by those who were "garden-crazy," and that we ordinary people who called *Aquilegia* by the commonplace name of "columbine" couldn't expect to have such luxuries. We were somewhat dubious also as to the amount of work necessary for their upkeep.

"But there are no weeds to hoe or lawn to mow on the area occupied by the pool," urged the proponents. These were weighty arguments, but it took quite a lot of reassuring on the part of friendly pool-enthusiasts to persuade us to "jump in and get wet"—figuratively speaking. Now our advice to any and all garden lovers is: "Come on in, the water's fine!"

Our back yard was only thirty-five by fifty feet, so in order to place our "waterscape" in just the right spot and to give it a suitable outline, we drew a sketch of the garden as it would look when completed with its pool, paths, beds, and lawn. This sketch indicated that the pool would appear less formal if placed towards one corner and given an irregular shape. We noticed that if placed toward the back of the lot it would get the full sunlight that lilies demand. We chose the lower of the two back corners for several reasons—one was so that it would seem more natural, because water tends to collect in low depressions; another was because one sees better reflections in a pool whose level is lower, and still another was because the excess dirt could be more easily disposed of. Most of this dirt, by the way, was heaped up along the back edges of the lot so that flowers on the sloping banks would be visible also by reflection. A line of rocks, behind a path, held it in place. We took care to keep the margin about five feet from the lot lines. More dirt came out of that three-foot chasm than we ever imagined, so we were thankful for this much space in which to throw the huge pile of "diggings".

A depth of three feet was chosen as practical, though authorities differ greatly in their advice—and the various kinds of lilies vary in their requirements, some needing only six inches of water. The surface, including the "bog garden," was to be about one hundred and fifty square feet.

The biggest labor-saving feature in building this pool was the elimination of the use of "forms" that concrete work so often requires. The only thing of this sort that

we used was a narrow flexible strip around the outside edge of the brim. This enabled us to give definiteness of shape to the edging and also to keep all parts of the edge even with one another. In checking the level, one should lay a spirit-level on a straight edge such as a "two-by-four" that has been thrown right across the hole, resting on these "forms" on opposite sides of the pool.

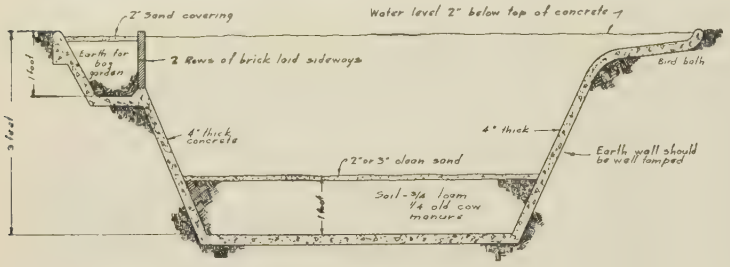

2" Sand covering
Water level 2" below top of concrete
Earth for bog garden
2 Rows of brick laid sideways
Bird bath
4" thick concrete
4" thick
2" or 3" clean sand
Earth wall should be well tamped
Soil - 3/4 loam 1/4 old cow manure
1 foot
3 feet

Fig. 2
Cross section of Garden pool

THE DESIGN OF THE POOL
Note particularly the shelf for the bog garden and the shallows for birds

MAKING THE BOG GARDEN
A wall two bricks high surrounding the western margin provided for the marsh plants

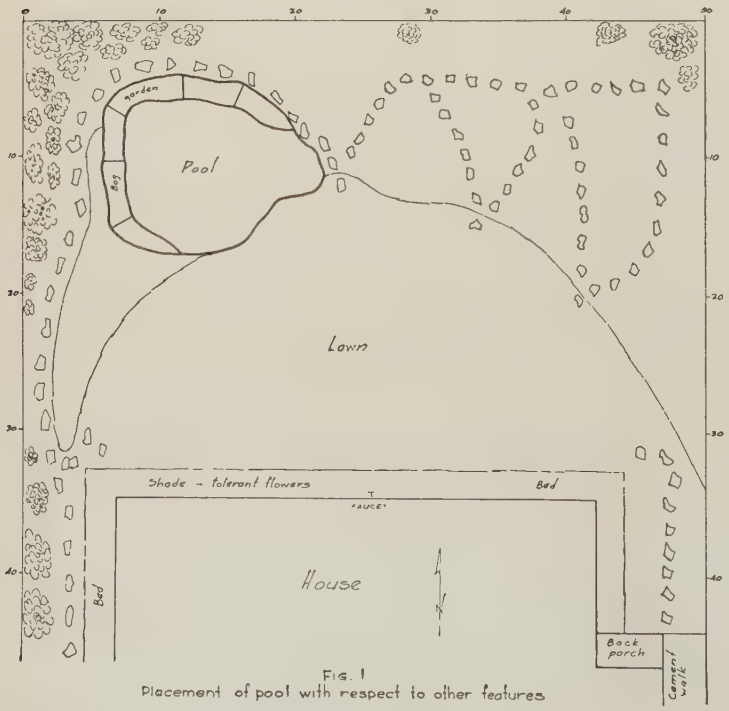


Fig. 1
Placement of pool with respect to other features

THE POND WAS PLANNED WITH CARE
Only after long poring over a map drawn to scale was the spot for the water garden selected

Having decided on the location and general shape, we started the "heavy work". The sides were sloped rather steeply—two feet in for three feet down. We left a ledge, about 10 inches wide and a foot down, for some two-thirds of the distance around the wall, as shown in the diagrams. This projection became the base of the "bog garden", to be described later.

After the dirt had been removed, we tamped the sides and bottom to assure a firm support for the concrete. Next we laid down a mesh of wire-netting to act as reinforcement. About 60 lineal feet of the 3-foot width were required to completely cover the surface of the hole. The edges were joined with wire or overlapped, as convenient.

When it came to putting down the concrete, we wanted to be sure to get the right thickness. We had figured the amount of concrete pretty closely and didn't want to run short by getting it too thick. Neither did we want it too thin in spots as this would leave weak places that might crack, due to strains from uneven expansion of thick and thin portions. Accordingly, we drove into the ground a generous sprinkling of wooden pegs, letting them project just four inches. These were all removed, of course, after they had served their purpose and before the concrete became "set". Care was taken to fill and tamp the openings left when the pegs were withdrawn, for even tiny holes may cause cracks if water ever freezes in them.

The second great labor-saving "stunt" was having the concrete delivered ready-mixed. This service is now available in many places and is certainly worth the slight extra cost. We had plenty of exercise without having to mix it ourselves. Also, we had the satisfaction of knowing that the mixing was done thoroughly. We specified the regular "1-2-3" proportion consisting of one part cement, two of sand and three of gravel, with the addition, however, of two pounds per cubic yard of a waterproofing ingredient known as "Biber". The regular load was two cubic yards and this exactly did the job with just a few pebbles to spare.

It is important to mix the concrete rather dry, as water can be added "on the job", but if the concrete is too wet it will tend to slip down when applied to the steep sides of the excavation. The wire mesh helps to hold it up until it has time to "set". This mesh should not be left at the bottom of the concrete mass, but should be worked into the middle to act as reinforcement. A button-hook is a convenient tool with which to penetrate the soft concrete and engage the wire mesh, pulling it up to the desirable

position. After a little experience we found we could add a few drops of water to each wheelbarrow load, thus making it easier to apply and easier to bring the fine stuff to the surface in the tamping process. By this treatment it became unnecessary to go over the surface with the usual mixture of cement (one part) and sand (two parts), such as is used on sidewalks. The only place we applied this coating was around the outside edge, after the forms had been taken off. This filled the "voids" and gave a more finished appearance to the job.

In working, we found it went best when one man wheeled the mixture to the hole and the other man applied the concrete. Instead of putting the bottom down first, it is better to start with the sides, taking one side at a time and building up the layer of concrete from the lower edge to the top edge. By leaving the bottom surface to the last, it is less likely to become dirtied over and its thickness can be slightly varied as necessary depending on how the supply of concrete is holding out.

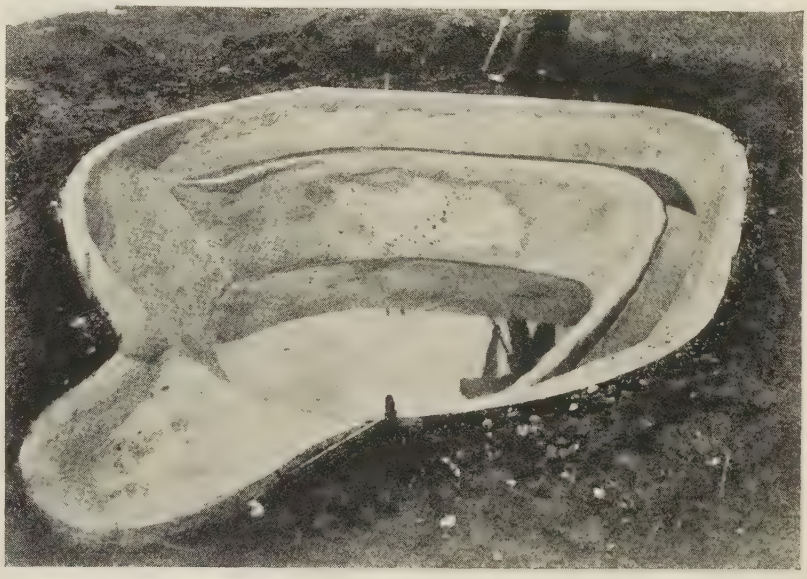
In order to keep the material clean as it is dumped from the wheelbarrow into the hole, some roofing paper or ordinary sacking can be used to cover the sloping dirt side. This device will also protect a slope where the concrete has already been tamped into place.

After completing the tamping process, we "painted" the entire surface with a creamy mixture of pure cement and water. An old broom served as a good applicator.

When the weather is warm, the surface should be kept moist by spraying with water at frequent intervals, beginning as soon as the surface has "set". If enough sacking can be found to cover the concrete, it is desirable to use it, as the moisture will be retained better in this way.

After the cement has "set" through its entire thickness for a day or two, one may step into it and lay the bricks along the edge of the ledge. Our pool took about fifty bricks. These were laid in a double row. The top of the bricks should be even with the top edge of the pool so that the surface of the bog will not get slimy, as it is likely to do if covered with water. The accompanying photographs were taken before we raised the level of the bog. The water level was designed to be about two inches below the edge of the pool. A coating of pure cement and water will give the bricks a color which is uniform with the rest of the structure.

Before stocking the pool with goldfish, we filled and drained it several times, leaving the water in for a day or two at a time. This procedure drew out the alkali which otherwise would have speedily killed the fish.



READY FOR BRICKS AND EARTH

The forms for the edge are still in place, and the concrete has just been wet down to prevent cracking

Next we put in the soil for the lily bed and bog garden. We used a mixture of three-fourths high-grade garden soil and one-fourth well-rotted cow manure. Lilies are heavy feeders and will thrive better if their food is ample.

In Seattle, pools no deeper than ours suffer no loss of fish or plant life in the most severe winters if "hardy" lilies are used. In pools hereabouts that were covered with ice for two or three weeks, the fish apparently "hiber-

HARDY LILIES SURVIVE THE WINTER

Sedge grasses and cat-tails fill the bog, and frame the white of the flowers

WITHIN FIVE MONTHS OF ITS CREATION

All the water plants made themselves quickly at home and the birds adopted the bird bath annex with glee

nated" or munched on anacharis grass. This kind of water plant is doubly useful in that it not only supplies food, but also gives off oxygen, thus obviating the necessity of adding fresh water, except to make up for loss by evaporation.

There was room for several varieties of lilies, so we chose from among those which are hardy in this climate three varieties of the Marliacea family to give the color effect we desired—Albida (white), Rosea (pink) and Chromatella (yellow). The two others which were added later than June failed to bloom last year. It may interest Northwest readers to know that water hyacinth, though multiplying rapidly, also failed to bloom.

Many of the plants for our bog garden were readily obtained from a near-by marsh. Our original planting consisted of water forget-me-not, arrowhead, tule, several sedge grasses, and half a dozen cat-tails. The last-named, though planted in the center of our "bog", spread throughout the entire length of the enclosure within five months! We suggest, therefore, that partitions be placed across this section to limit the activity of certain prolific plants to the particular area where their growth is desired. We plan to introduce this year other bog plants including water arum and the humble, though colorful, skunk cabbage.

After all our water and bog plants were in, we covered the entire dirt surface with two inches of clean sand to keep the earth from muddying the pool. Water was then added to a height of only three or four inches to allow the lilies to become adjusted to the new temperature. Two or three days later we increased the height three or four more inches, and so on until the water came within about two inches of covering the bog. Of course, the bog plants had to be watered copiously during this time. However, we were repaid for our trouble by great quantities of lovely lily blooms that kept coming until about October first.

Two goldfish and a few Japanese snails complete the family picture. The goldfish seem to have plenty of natural food, including mosquito larvae, for they scorn such viands as we throw to them. The snails have plenty to do, keeping everything swept up and the garbage attended to!

The absence of an outlet is no drawback to draining the pool if necessary, as this can be done by using a garden hose as a syphon, provided there is any lower spot available within the length of the hose. In some cases, it can be run to the wash-tubs in the basement.

Our pool has a "bathing-beach annex" in which the water's maximum depth is about two inches. Its bottom slopes very gradually, thus permitting our feathered friends to wade in as far as they wish, whether they be long or short-limbed. The presence of birds in our garden is not only a source of continual pleasure, but a very practical asset as well, for the number of insects will be considerably reduced by their efforts. We left the edges of the bird-bath free from plants which might act as a "blind" behind which neighborhood cats could prepare to spring upon their prey.

A fountain can easily be added at any time when it is desired and this procedure is far simpler than if pipes are imbedded in the concrete. When pipes are "built-in", provision must be made for their complete drainage as otherwise the water left in them will freeze during the winter and cause ruptures. As good a way as any is to construct a triangular-shaped support of wood, burying it in the earth at the bottom of the pool with a long "leg" projecting in a vertical position, almost to the surface of

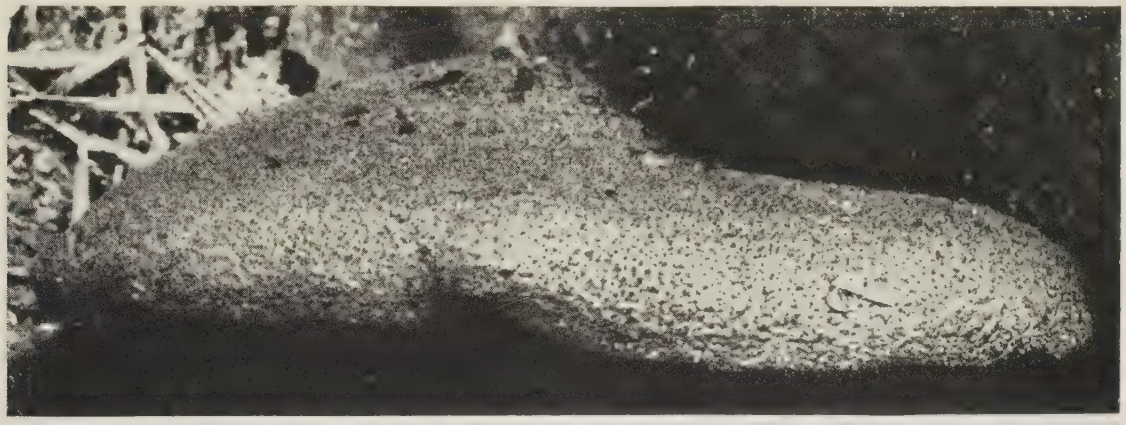
the pool. A section of pipe can be attached to it and the upper end terminated in a spray-type nozzle such as is used in fixed lawn-sprinkling systems. The angle of spread must not be too wide for the pool involved. The bottom end of the pipe should be connected through an "L" joint to another section of pipe which is bent to rise up over the edge of the pool in an inconspicuous place. It should terminate either in a connection suitable to receive a garden hose, or it may go directly to the water supply system, through a suitable faucet.

The use of such a fountain is more restricted than if an overflow were provided, but on hot days when it is most appreciated, evaporation will usually be rapid enough to permit considerable play. The "fountain effect" can be obtained by the use of only a very small quantity of water, if the nozzle is properly selected and the input pressure properly adjusted to the faucet. It has the advantage of being readily removable in winter.

To merge the margin harmoniously into its background of shrubs, we planted Japanese iris, zebra grass, "elephant ears," and gypsophila. These were carefully placed with respect to our bog plants. Height, coloring, habit of growth and other factors were carefully taken into consideration. We plan to augment our collection by using Pampas grass, bamboo, and yellow iris, *I. pseudacorus*. Zinnias, gladiolus, and *Phlox drummondi* added touches of color here and there along the margin.

As a background for the pool, we have planted a few shrubs, selected to insure, so far as possible, a succession of bloom. These include certain flowering sorts which grow wild hereabouts, such as wild currant, mock orange, and Indian arrow-wood. More ordinary plants like Japanese quince, hydrangea, buddleia, (the butterfly tree), lilac, weigela, and deutzia help to fill out the cycle of bloom.

For those to whom cost is a consideration, the following items may be of interest: materials (concrete, cement, sand, bricks, wire-netting and batten for forms) $17.42; helper's time (1½ days at $4.50) $6.75; total, $24.17. We feel that our enjoyment this first season well repaid us—and there are all the years yet ahead in which to watch the growth within and around our "oasis".



THE BEEFSTEAK MUSHROOM READY TO PICK—AND EAT

It is easily distinguishable by its shape, color and resemblance to a choice cut of meat, and is delicious

AN OAK STUMP PLAYS BUTCHER SHOP

BY G. G. NEARING

IF YOU wish to see the vegetable kingdom's nearest approach to meat, watch old stumps of black oak and chestnut between the Fourth of July and the first shell of autumn ice. First you will find flesh-red lumps as big as the end of your thumb. Do not pick them, for they will go on growing three or four days.

The morning after it first appears, each lump will have swollen to the size and shape of a turtle's head, which further lengthens and widens during the following forty-eight hours into a broad red tongue. Now pick it and prepare yourself for a number of surprises.

It feels heavy and damp like raw meat. The grain when you break it looks almost exactly like beef tongue. From the break there slowly oozes a reddish juice. You would almost think that the stump had turned butcher's block and supplied you with a tender cut for dinner. And you will not be far wrong, either! You have in your hand the beefsteak mushroom, and it is deliciously good to eat.

Be cautious about eating wild fungi, but do not hesitate to try this one, for there is nothing else like it in the world. You will enjoy it best raw in a salad. Slice it across the grain, first removing the upper skin and the layer of red jelly you will find there—this for appearance. You can also cook the beefsteak mushroom, and may like its slightly acid flavor.

Some specimens grow no larger than the palm of your hand, but you will often find them six or eight inches long, and occasionally one that weighs several pounds. The form varies, too, from a tongue or fan shape to an irregular mass, with or without a fat, wrinkled stem.

Do not eat old ones. After the under surface has turned brown, worms invade the flesh, and the mushroom is no longer inviting. Those which are white beneath are always fresh, crisp and tender.

VOICES OF THE MOONLIGHT

BY OLAUS J. MURIE

Ade and I had been picking our way down from Two Ocean Pass. The country was new to us and we eagerly scanned each turn in the forest trail for an opening, a vantage point from which to view the wider landscape. As the afternoon wore on, the monotonous creak of saddles, the steady nodding and plodding of the pack animals lulled our senses to drowsiness. Then, unexpectedly, we came into a little meadow. Through a fringe of trees we glimpsed a great valley below us, a vast, flat grassland with scattered clumps of willow. Through it wound a silver ribbon. That would be the upper Yellowstone! Through that cleft in the hills, yes, that must be the Thorofare. And there we shall camp tonight.

We moved forward with quickened interest and soon were threading our way through the swampy bottom land of the Yellowstone. A cow moose lunged off through the willows. We passed a beaver house in a blind channel. High overhead an eagle soared. The wide sweep of the valley landscape, sheer cliffs and bold mountain slopes with heavy green forest, the tang of autumn, all added to the rapture of the moment. Here was wilderness.

We camped on the Thorofare that night. We had found a little grassy flat beside the stream for our horses, and our tent stood snugly just within the edge of the woods. Around the Thorofare valley rose the mountains, steeply. Ours were the clear bright days and frosty nights of perfect autumn, and the moon was coming, bigger and brighter every night. We had first noticed it back on Wolverene Creek, when it had hung pale against the afternoon sky. Tonight it was full.

It is not my purpose to attempt an enraptured recital of the charms of moonlight, the province of the poet and the lover. But Lady Moon will always color man's life and I would suggest a corner of the wilderness as her shrine.

We had been across the river and were returning to our camp when we saw it up the valley, bulging over the skyline, a rich orange at first, with tree silhouettes moving across its face in a steady procession as we walked. Later it hung, pure silver now, suspended clear above the trees and the rough contour of surrounding mountains, looking down into our little nook in the wilderness.

I remembered that before sunset the pine woods had stood about us in deep green, with a splash of gold among the aspens. The meadow lay bathed in rich yellow hues of autumn grass and brown of the willows, from pale greenish yellow to deep russet, with overlying tints of gray. Truly a rich display.

Now, by the alchemy of moonlight, all was transformed into a soft duotone of black and silver. The tiny meadow lay silver bright, overlaid with a dark tracery of moon shadows from the pines. On the forest floor about our tent lay the same network of shadowy limbs and twigs, while in the deeper woods a few gleams penetrated in scattered flecks that silvered the underbrush.

We scarcely broke the silence with speech.

"It bothers me," I ventured. "I can not grasp it all. I want to do something with it, but don't know what. It is this tiny little ache, with all the beauty, that stirs me."

I felt stupid at my own trite words. Who has not already said as much? An old, old yearning, this. But the fervent assent of my companion proved this yearning to be ever fresh.

We walked on in silence across the silver meadow to our camp.

"Who-whoo, whoo, whoo," came a soft voice up the valley.

"Who-whu-who-whoo, whoo, whoo," came a higher voice in quick response.

Horned owl! All that was needed to give voice to the moonlight. But another sound broke

in on the owl duet: "Eeee-ee-ee-ah-h-h-eough!"

A clear bugle call, rising in a silvery crescendo, falling gracefully to end in a low grunt; the bugling of a bull elk. His ringing call went echoing in a confusion of rippling sound among the mountain walls. We pictured him there on the opposite slope, the antlered master of his little harem. His was the fulfilment of elkhood, a bull in his prime, in mating time! Was this his challenge to any possible rival, to the world? Possibly, but more, I believe, an expression of his exuberance, his song, perhaps a little defiance mingled with the ardor of his love making. And was it not, perhaps, colored a little by the flood of moonlight?

The owls, I knew, had long since raised their family. Who will fathom the intricacies of owl nature?

But there were other voices.

"Aooooo-o-o-oo-o-o," a long, clear call rolled up the valley, mingling with its echoes and trailing off into silence. A rival bull elk?

"Yeow! Yeh! Yeh! Yeowoooo-o-o-o-o-o" was the answer, and we knew these were the ululations of coyotes. Hard upon these two came still a third, far down the valley. "Yah! Yah! Ow-ow-ow-a-a-a-a-ooooooo." Then the first again, until the ringing chorus and its echoes filled our valley to its brim. First one and then another lowered his voice. There were a few quavering notes, the echoes died, then silence. Once more the silver meadow, with its moon shadows, and the low murmur of the river.

We wondered. Were those other creatures of the night responsive to the spell of the moon? Are we human creatures the only ones who thrill to a silvery night? True, the day before we had heard the coyotes sing out in the garish light of midday. Perhaps the tang of autumn had been their inspiration. I once had two pet coyotes who each night were set off on a wild duet by the curfew whistle; a mechanical stimulus, surely. Nevertheless, it seems logical that these fellow creatures share with us in some degree the appeal of Nature's moods. True, they do not philosophize about it. We, ourselves, are often moved unreasonably.

As we lay abed, with the tent wide open to the moon, we were content. These woodland voices had enriched the night, had revealed to us the vibrant life lying hidden within the cover of our moonlit valley. We drowsed at the faint sound of the river.

But once more our consciousness quickened, for a new note, a distant throbbing, came to our ears.

"Thump, thup, thup, thup, thrrrr-rrrrr." Surely the drumming of a ruffed grouse! What was he doing, drumming in September? The moon again?

Faintly it came again and again, until it mingled with the murmur of the river and merged into our dreams.

AN ODD HOME

BY LAWRENCE D. HIETT

PHOTOGRAPH BY THE AUTHOR

THE CONTENTS of a paper bag on the wall of a shed were the objects of our trip to a little fishing community on the southern shore of Lake Erie, about fifteen miles from Toledo, Ohio. It was an ordinary paper bag partly filled with nails, laid aside earlier in the spring by a fisherman, but it also harbored a prothonotary warbler's nest, with five baby birds snugly cuddling in it awaiting the return of their parents.

Here, in the bag, the warblers successfully raised their brood, keeping their young well supplied with food from the near-by swamp. Entrance to the home was made through an open window. Little attention was paid to the men as they moved about inside the building.

For years prothonotary warblers, considered rare in northern Ohio, had been a common sight about the buildings in this fishing village. Several individuals of this species were seen in the vicinity during our visit, and another nest was located in the hollow trunk of a tree close to water. Such locations are natural nesting sites.

Certain pairs had nested in a nail-pail, in another shed, for three consecutive years, and previously other receptacles such as boxes and coffee cans had been used.

It was a treat indeed to observe these beautiful creatures in this friendly relation to man; for to us they had been associated with only impenetrable swamps and wooded water courses far from usual human haunts.

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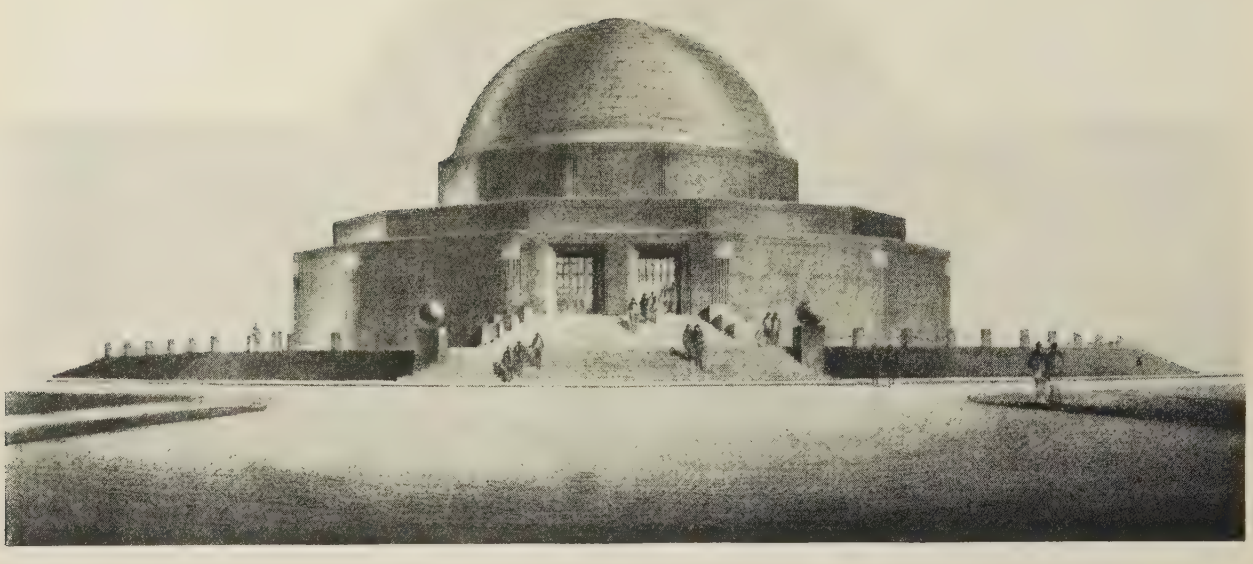


THE ADLER PLANETARIUM AND ASTRONOMICAL MUSEUM OF CHICAGO

The first of its kind in the United States, it has been visited by three-quarters of a million people in one year

THE HEAVENS CAPTURED

THE PLANETARIUM BRINGS ASTRONOMY TO MANY MILLIONS

BY ISABEL M. LEWIS

PHOTOGRAPHS COURTESY CARL ZEISS, INC.

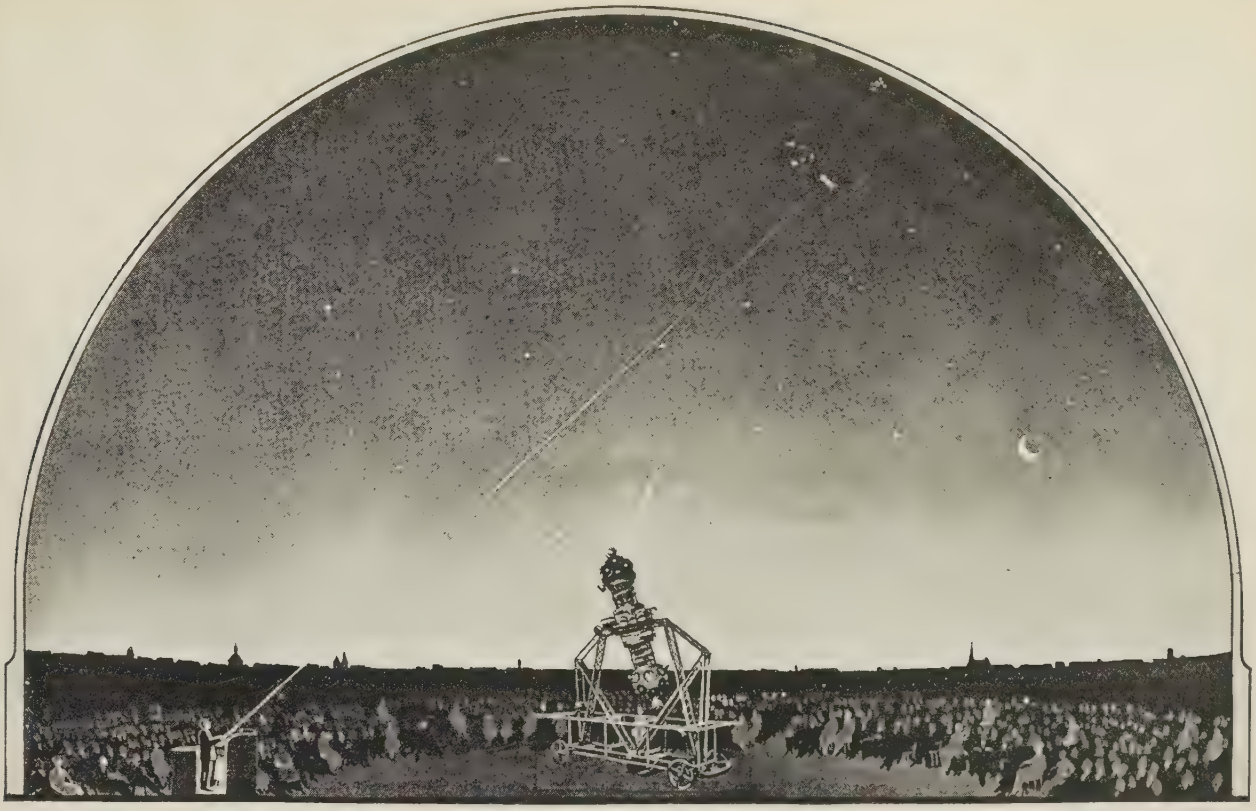
IF YOU will leave Michigan Boulevard and cross Grant Park, built by the City of Chicago along its southern shore front, you will come to a remarkable group of educational buildings of beautiful and imposing form. There you will find the Field Museum of Natural History, the Shedd Aquarium and the Adler Planetarium. The last is the gift of Max Adler to his city, and is more completely known as The Adler Planetarium and Astronomical Museum. It is a significant gift and a notable institution, both for itself and because it is the first Zeiss projection planetarium in the United States.

Approaching this building, with its domed roof, prophetic of the astronomy for which it stands, you will notice a dedication plaque. On this you will read that the Adler Planetarium was given "to further the progress of science . . . to guide to an understanding of the majesty of the heavens . . . to emphasize that under the great celestial firmament there is order, interdependence and unity."

In other words, the planetarium has been erected to bring popular astronomy to the people. It serves to give to the man in the street a more intimate appreciation of the splendors of the starry skies. In the year of its existence, since its opening in May, 1930, the Adler Planetarium has been visited by three-quarters of a million people. Under the directorship of Dr. Philip Fox this unique educational institution has already amply justified the generosity of the man who made it possible.

Appropriately, the last annual meeting of the American Astronomical Society was held in the planetarium building. There, for three successive days, the assembled astronomers had the opportunity of observing eager crowds standing in line for the privilege of seeing the frequent demonstrations and hearing the fascinating lectures. These take place in a room with a white, domed ceiling, around the edge of which, about six feet above the floor, the skyline of Chicago is shown in silhouette. In the center of the room stands a complicated machine—the Zeiss Planetarium instrument that makes planetariums possible the world over. The halls outside

Last summer the Editor of Nature Magazine visited the Adler Planetarium in Chicago. He was fascinated not only by the remarkable astronomical demonstration itself, but, also, by the tremendous interest shown in astronomy thus presented. The possibilities of such institutions are unlimited. The United States is years behind Europe in realizing this. Every city that can possibly find it within its educational budget, or within the means of some public-spirited citizen or citizens, should have a Zeiss Planetarium within its borders.



THE PLANETARIUM PROJECTION ROOM WITH A LECTURE IN PROGRESS

Note the silhouette on the surrounding skyline and the luminous pointer used by the astronomer in pointing to the skies

the circular room are lined with fascinating astronomical instruments of today and yesterday, including the noted Mensing collection of old scientific instruments.

One evening Dr. Fox gave a demonstration and lecture to astronomers attending the scientific meetings. Perhaps the most striking feature of the demonstration was the sudden flashing forth in the darkened room of the familiar constellations in all their glory. On the hemispherical dome they would appear as clearly and realistically as on an exceptionally clear night in Arizona. There is no disappointment in the planetarium because of rain or clouds. Skies are always clear and the stars are always at their best. The Milky Way is reproduced in all its beauty. The sun rises, crosses the meridian and sets, its light dimmed that its path with respect to the stars may be seen. Moon and planets appear in their proper times and positions. The appearance of the heavens may be reproduced for any day, season or year desired, past, present, or future. Celestial events may be speeded up so that changes that take place in a year may be compressed into a period of a few seconds.

ZEISS PLANETARIUM IN MOSCOW

A rear view of the structure showing the room at the left for the projector

Every star in the heavens visible to the naked eye is faithfully reproduced in the planetarium. How simple a matter it is to learn the forms and names of the various constellations since it is possible to project the names of the constellations so that there may be no question of the identity of the group. In addition a luminous arrow, similar in operation to a flashlight, is used by the demonstrator to point out any star or group. A number of

star clusters and nebulae that are of particular interest and that are faintly visible to the naked eye are also represented, such, for example, as The Great Andromeda Nebula, the great Hercules star cluster, the Orion Nebula and The Beehive in Cancer. In the planetarium it is possible to give one a vision of the heavenly bodies that one could not acquire in the ordinary course of instruction in days, if ever. Certain astronomical facts, particularly those of an abstract nature, are not easily taught with the aid of books and diagrams alone.

THE ZEISS PLANETARIUM PROJECTOR

This remarkable machine, with its many eyes and seven motors, captures the heavens for all to see

The Precession of the Equinoxes, one of the most difficult subjects to comprehend, is a simple matter when one can actually see the effects of precession as the vernal equinox slips slowly westward along the equator and the north pole of the heavens performs its slow revolution before our eyes around the pole of the ecliptic. If the year is speeded up so that one revolution of the earth around the sun is completed in seven seconds, as is possible in the planetarium, all the great precessional changes that take place in a complete 26,000-year cycle are compressed into a period of 50 hours and even in a few minutes a change in the position of the pole-star and of the position of the vernal equinox among the constellations of the zodiac becomes noticeable.

When needed for purposes of instruction certain projectors throw upon the starry canopy overhead the reference points and circles of the celestial sphere, the meridian, celestial equator, the ecliptic, the equinoxes, zodiac and so forth. The terms right ascension and declination, so puzzling to the student, are easily illustrated. One sees readily enough in the planetarium what is meant by the "diurnal arc", and how the days lengthen in summer and the sun changes its elevation above the horizon with the seasons. The moon goes through its phases in the course of the lunar month, which, in the planetarium, may be reduced to eighteen seconds or less. During this period its change in position with respect to the sun and the corresponding phases are most realistically shown. One understands

THE PLANETARIUM IN STOCKHOLM

Opened during the useful arts exhibit, it was visited by more than 340,000 people in four and one-half months

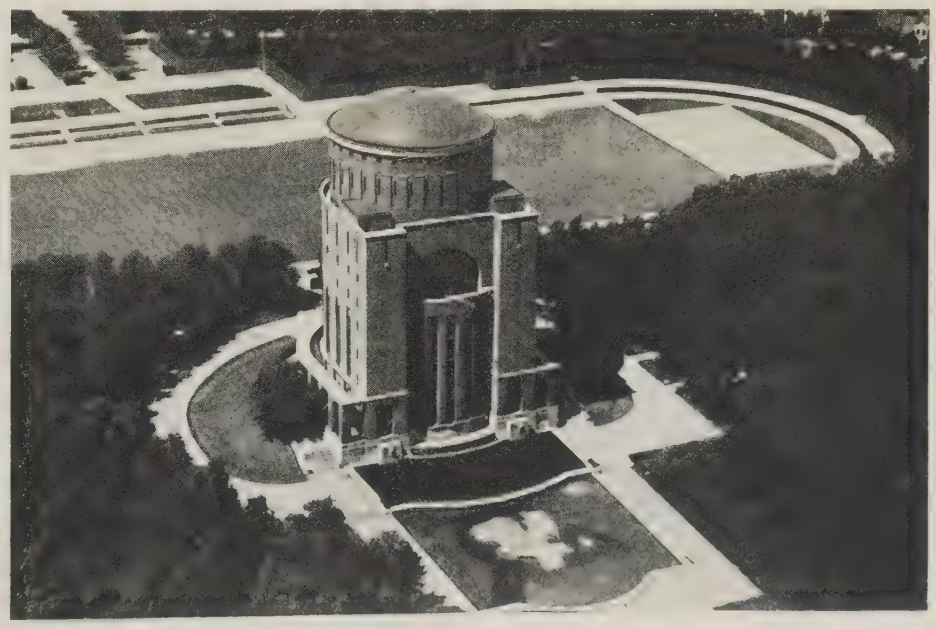
THE ATTRACTIVE PLANETARIUM IN THE PARK AT MANNHEIM

This building was constructed by means of the Zeiss network system, concrete sprayed into a rib network of iron rods

why Mercury and Venus are always evening or morning stars and are never seen at midnight and how the planets describe, apparently, loops in the heavens as a result of changes in their positions relative to the earth while the earth and the planets revolve around the sun. All those strange astronomical terms such as elongations, stationary points, and retrograde motion are easily understood when one sees them illustrated in the speeded up motions of the planets in the planetarium sky.

One of the most fascinating features of the planetarium is the opportunity that it gives to view the heavens as they appear in all latitudes from the north pole to the south pole. Argo Navis, that glorious constellation of the southern hemisphere, the Southern Cross, the Magellanic Clouds, Canopus, the second brightest star, Achernar, Alpha Centauri, the nearest star, all the beauties of skies that lie below the horizon in our latitude may be seen in a trip from pole to pole accomplished in a few moments. Here we may see the midnight sun either in north polar or south polar regions and understand just how topsy turvy the heavens of the southern hemisphere appear to one accustomed to northern skies.

It is not possible to enter into a description here of the Zeiss Planetarium Projector, that weird dumbbell-shaped instrument that produces all of these remarkable effects on the white linen dome overhead that represents the starry heavens. When in the darkened lecture room the switch is thrown on, one is suddenly transported in effect to the great outdoors and sees in a sky of deep nocturnal blue myriads, apparently, of twinkling stars. An involuntary exclamation of wonder and admiration sweeps over the audience. The two bulbous ends of the projector make possible the projection of the stars visible either in the northern or southern hemisphere. The upper

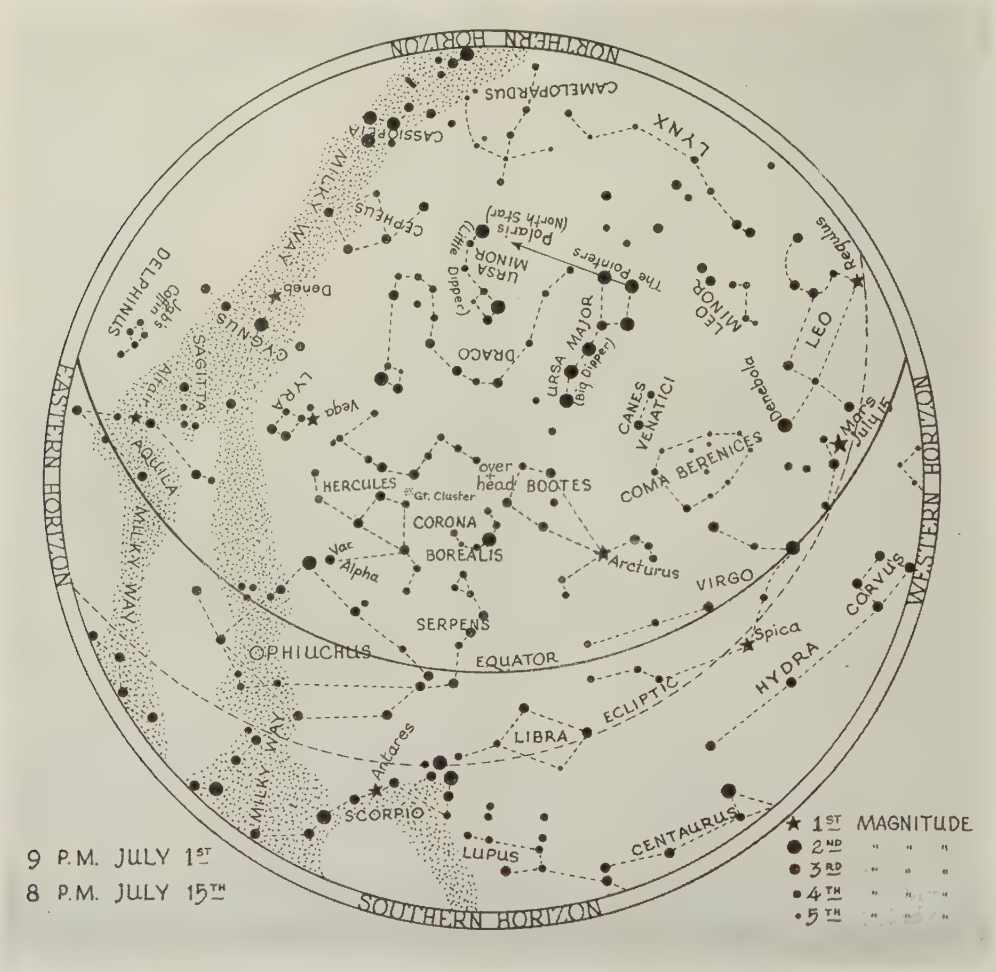


HAMBURG'S ATTRACTIVE PLANETARIUM

It has been made a part of the water tower in the municipal park, which is a good suggestion to other cities.

end of the instrument is used in projecting the stars of the northern hemisphere. When it is desired to study the constellations of the antipodes the instrument is revolved around its central, horizontal axis. When the instrument assumes a horizontal position the stars of intermediate latitudes are projected upon the dome. Easily and quickly the instrument may be adjusted so that the appearance of the heavens in any latitude may be faithfully reproduced.

The two small spheres at the extremities of the instrument contain 32 projectors for the principal constellation names. The central cylindrical portion of the instrument, the handle of the dumbbell, contains planet projectors that rotate in the proper periods to reproduce the motions of the planets in their orbits, the moon and the apparent motion of the sun through the heavens. Both the diurnal motion of the heavens and the orbital motions of the earth, moon and planets are accurately reproduced. The planet projectors in the cylindrical part, named in order from top to bottom, are for Saturn, the sun and zodiacal light, the moon, Mercury, Venus, Mars and Jupiter. Uranus and Neptune are omitted since they are not visible to the naked eye. Fifty-four hundred stars are represented, all (Continued on page 62)



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

JULY EVENING SKIES

THE most brilliant stars now visible in the evening include Arcturus, the reddish-orange star in Boötes, the beautiful white Spica in Virgo in the south, Regulus, still visible in the west in Leo, red Antares, far over in the southeast in Scorpio, and Vega in Lyra, a rival of Arcturus in splendor, now high in the northeastern sky. Altair is also visible in the east in Aquila and the Milky Way is appearing in the eastern sky.

Mars is still visible in the west. It passes from Leo into Virgo this month. It is now receding from the earth and decreasing in brightness. Jupiter is in Cancer and too close to the sun to be seen this month. It comes into conjunction with the sun on the 25th and after that passes to the morning sky. Saturn comes into opposition with the sun on the 13th of this month when it rises at sunset and remains above the horizon all night. It is now in Sagittarius. Venus is now low in the eastern sky at sunrise and is not in a favorable position for observation. Mercury is not well placed for observation at this time and it is doubtful if it can be seen at any time this month, though it is an evening star low in the west the end of July. This is an interesting month in the skies.

BEAUTY AND BETTER BUSINESS

CONDÉ NAST PLANT A MODEL

By P. F. HANNAH
ASSISTANT EDITOR

THE CONDÉ NAST PRESS, whose Greenwich, Connecticut, plant is a show place along the Boston Post Road, is a pioneer in a new trend—that of taking Nature as a partner. It has spent almost a million dollars and unlimited labor in creating with tree, shrub and flower one of the most beautiful plants in America, and it is proving that beauty pays dividends.

The plant might be mistaken, by a casual observer, for a palatial private estate or a public park. The long, low buildings are separated from the highway by a spacious lawn of putting-green excellence and a thick fringe of trees and shrubs that all but hide them from sight. A large fountain plays refreshingly in front of the main entrance to the executive offices. Across the highway is a large formal garden flanked by a rock garden—both masterpieces of the horticulturist. Few flowers that will grow in the rigorous climate have been omitted, and all plants are labelled for the information of the visitor. Trees—old New Englanders of maturity and dignity—cast their

ALONG THE WALK TO THE TOWER
Not a corner of an old garden, but a lane bordering one of the busiest and most productive American printing plants

LOOKING TOWARD THE TOWER FROM THE ROCK GARDEN
The summer house, in the foreground, is reached by running the gauntlet between two beautiful borders, filled with blooms most of the time

TRY TO DISCOVER THE CONDÉ NAST BUILDINGS BEHIND THE FOLIAGE

They are hidden behind this fringe and shrubs. The fountain is playing in front of the main entrance

shade everywhere. An attractive summer house that serves as a bus waiting-room for employees flanks the gardens and adds an appearance of hospitality to the park.

Not long ago the Press spent $50,000 to replace the telephone poles in front of the plant with underground wires, indicating the lengths to which the firm will go to improve and beautify. No person travels over the Boston Post Road, the link between New York and New England, without noticing the Condé Nast Press. No visitor to the plant goes away without being impressed. The outward beauty suggests like accomplishment in the creation of a printing job. The Press now prints 15 magazines, including Nature Magazine. Its beautiful surroundings have led to better business, and its advertisement is more effective than all the billboards that mar the landscape along the highway it adorns.

IN THE HEART OF THE FORMAL GARDEN WHERE NATURE REIGNS

Not only visitors, but the employees themselves, delight to roam in this spot, so different from the usual factory setting

Helps and Hints

FOR HOME AND GARDEN

PLANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

If you have to apologize for your garden n July because there are so many blank places, devoid of color or entirely bare, there s something wrong with your planning. Of course not every part of any garden can be in bloom all the time nor would we want it to be. The flower that is constantly n bloom generally becomes common and we ire of it. But a well planned garden will nclude a sufficiently wide range of material o have a variety of things blooming all the ime and some particularly striking feature is a headliner. For example early June can feature iris to be followed by peonies or roses. Some gardens contain feature displays of delphinium with the chaste Madonna lily as a companion display. July finds hardy phlox blooming brilliantly in numerous borders or maybe regal lilies inimitably grouped against a foil of greenery. Throughout every month of the growing season there should be something making a special show n your garden.

The way to secure these effects is through careful planning. Each part of your garden should be specifically planned and planted o provide as nearly continuous bloom as possible with one particular season holding he leading position. You will not be able o get the effects desired in a single year but gradually you can study and develop he different parts. By carefully working out a succession of bloom for each section nd keeping notes upon it from season o season and year to year you can get the right effects.

Don't overlook the value of a garden note book. It can record so many important events as the months go by. Records can tell you when to plant and how long from planting till blossoming takes place, they can note he various things blooming simultaneously nd the combinations to be desired or voided. Your note book can list the new hings you want and sources of supply. t can act as a reminder of work to be done and aid your garden in countless ways. Once you get the habit of using a garden note book you will wonder how you got on vithout it.

During the coming months there will be flower shows in nearly every community. Thousands will visit them but only a few will receive lasting benefits. Among the displays there will be many with which you may not be familiar. This will be your opportunity to learn and maybe you will wish o add some of these things to your garden. Take your note book with you to the flower hows and when you visit gardens. Something will always be found that you'll want o note. You should make it a point to

(Continued on page 61)

"IT'S NOT A HOME UNTIL IT'S PLANTED"

Now ~ everyone can have an OUTDOOR LIVING ROOM · ·

NO longer need you deny yourself the joys of an OUTDOOR LIVING ROOM . . . that colorful beauty spot which distinguishes the modern home.

For today, everything necessary to create an OUTDOOR LIVING ROOM is available under more favorable conditions than for years past.

Trees, shrubs and flowers, of the most desirable varieties, can be secured in good sizes, at decidedly moderate cost. Skilled workmen are plentiful, and at fair wages.

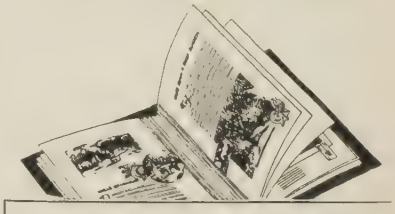
A booklet, "How To Make An Outdoor Living Room," has been prepared to help you plan and plant. Send for your copy today. Study it. Then write or consult a nurseryman or his representative. He will help you achieve a beautiful, modern OUTDOOR LIVING ROOM.

Plan now to Plant!

NATIONAL HOME PLANTING BUREAU
Sponsored by the American Association of Nurserymen

This Book Tells How

Send 10c for a copy of "How To Make An Outdoor Living Room." Also available, a booklet, "How To Plant The Home Grounds." FREE.



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IRIS "PRIZE WINNERS"
22 Varieties for $13.50

CONTAINS many that recently sold at $25.00 to $75.00 a plant; all prodigious bloomers, of rugged growth and the easiest possible culture. Each the finest of its type, in many beautiful colors, tints and blends. Flowers of gigantic size and exquisite fragrance; as handsome as the choicest orchids. Some have petals like plush, others of delightful silky texture, and still others seem to be made of the finest porcelain.

There are no duplicates; 22 different types of beauty to enthuse about.

These 22 PRIZE-WINNING BEAUTIES have been selected as the result of 25 years' experience growing and testing 3,000 varieties of Iris.

Nothing will beautify the garden quite so much as these modern Irises. July is the month to plant this collection.

PRIZE WINNER COLLECTION . . 1 EACH OF 22 SUPERB VARIETIES ALL LABELLED, NO TWO ALIKE, FOR $13.50
3 EACH, A TOTAL OF 66 PLANTS FOR $32.00

ROBERT WAYMAN, Box U, Bayside, Long Island, N. Y.

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

Bobwhite's Protection

In a magazine devoted to the Southwest the fear is expressed that Oklahoma may make the mistake of establishing a long state-wide closed season on quail. The statement is made that the birds were virtually exterminated in Kansas by a five-year closed season; and that Ohio, after putting the quail on the song-bird list, experienced a steady decline in its stock.

Among all the millions of readers of our multitudinous dailies, weeklies, quarterlies, and monthlies, we suppose there are many thousands who will believe almost anything, but we thought that this old fable about quail being unable to live without being shot had gone to the discard everywhere. It will certainly be a surprise to the bird lovers of Ohio, at least, to learn of the precarious status of their quail after fifteen years of protection. And, by the way, we have just learned that Ohio, under the leadership of the Women's Clubs and the farmers, has successfully resisted an attempt to sentence the quail to another term on the list of game birds. And among the arguments combated were two that have a familiar ring. The proponents of the plan to save the quail by killing him asserted that, owing to no shooting, the birds had steadily deteriorated physically, and that they had become so numerous as to be a serious pest to the farmer. Those who claim such absurdities show a lamentable ignorance both of the quail and of the story of his liberation. For it was the farmers who were largely instrumental originally in saving the quail from destruction, and their reasoning was backed by scientific research of the food habits of the bird.

We hope that the farmers and other bird lovers of Oklahoma will prove themselves as alert and intelligent as were those of Ohio.

The Vanishing Musk-ox

We thought that the present precarious status of the musk-ox had been sufficiently impressed on the sport-loving public to insure some compassion for the species, and that these relict animals were no longer shot down wantonly by those who consider themselves sportsmen. We were, therefore, distressed and a bit discouraged to read in a recent issue of one of our most prominent sportsmen's magazines the story of a hunt made in the Arctic last summer by a party of eleven Americans. Seemingly the musk-ox was one of the special objects of pursuit, for we are told of the killing of several, though in a way that leaves the impression that the deed is not considered one to be proud of. The boast is made, however, that each of the party added this rare animal to his score. Necessarily, only the heads were taken.

From the circumstantial accounts of hunts of other days all readers of Arctic literature know that the killing of musk-oxen, once the animals are reached, affords about as much sport as the slaughter of tame cattle in a barnyard. Apparently, however, as long as any can be found, each sportsman able to get to their haunts must have his trophy.

We are told, also, of the shooting of seals of several species, animals "easy to hit but hard to kill", that "packed a lot of lead". No true game birds are mentioned, but the Arctic sea birds, on their nesting grounds, paid toll to a company that must have fodder for the guns that each had brought. A polar bear, missed with rifles at thirty yards, after being peppered in the face with shotguns, was finally killed. Others were slaughtered from the boat, though we are spared the details.

Altogether the story of this summer hunt is intensely disgusting and leaves one with a feeling of fear for the future, and a sense of wonder that the lessons to be gained from such instances of wanton slaughter are still unheeded.

Bobwhite for Stocking

A generation or two ago the bobwhite of our northern states began to feel the effect of the shotgun. So the game wardens took thought of the teeming covers of the South, and learned to trap and transport southern birds to northern coverts. First, the fine birds of the Carolinas were drawn upon. After a time these states, beginning to feel the pinch of scarcity, declined to give up their birds. Then Tennessee and other neighboring states, and finally, Arkansas, Oklahoma, and Texas were successively requisitioned. By the time Mexico's birds came to be drafted, some of the states that had originally furnished stock were clamoring for it themselves. Mexico's birds became harder to get and were not always satisfactory, and some experiments in breeding quail for stocking were made.

Not long after this the commercial breeder of bobwhite came on the stage. One in particular, in Tennessee, advertised extensively in the leading sportsmen's magazines. According to his story, he had extensive quail-raising farms; he shipped birds anywhere; he produced more birds than all other agencies combined. And, as a matter of fact, he charged from two to three dollars for each bird, according to the number handled. As these lines are written his advertisements still appear in magazines. But late in March of this year his little bubble was punctured. He was suspected of being crooked, and his operations were investigated. It was found that upwards of 40,000 quail were being distributed each year by him, and that nearly all of them had been trapped by farmers in neighboring states and bought at fifty cents each. When his premises in Memphis were raided, a large lot of birds, crated for shipment, were found, but the proprietor was not at home. Bogle had bungled, but he is still at large.

The moral is: If each state will look after its own quail, as Ohio is doing, more crooks will be free to earn an honest living.

Practical Conservation

Conservation is a much-abused term, nowadays, but to us it means, as far as it concerns our wild life, merely protection from death, and helping to live. And we are glad to learn that the Westchester County Conservation Association, of New York, has put into operation a plan that bids fair to protect wild life and to make of its territory an immense sanctuary.

It is Westchester County's fate to adjoin the great swarming place of humans—New York City. Its land-owners face a condition that is becoming increasingly intolerable. When the hunting season opens, the swarms of armed ones invade the lands of home-owners, golf clubs, or what not, intent only on killing birds and game.

So a special committee of the Association formed the corporation called Landowners' Mutual Protection, to protect its members from trespass, and to provide the wild animals, birds and plants with sanctuaries. In three months nearly 5,000 acres have been posted against trespass.

A headquarters is maintained and police assistance may be obtained at any hour. Prosecutions are vigorously pressed and substantial fines follow conviction. The potential relief to the harried wild life is incalculable.

The plan seems worthy of emulation by thousands of similarly harassed communities. William Vogt, White Plains, New York, is manager of Landowners' Mutual Protection, Inc., and will be glad to help.

New Jersey Woodcock

An editorial note in "The Auk" for April, in commenting on a slight change in the woodcock season in New York (though one of no benefit to the bird), refers to a distressing condition that confronts this harassed creature in New Jersey. We quote from "The Auk", April, 1931, page 334: "While the woodcock season has been slightly changed in New York it remains the same in New Jersey where thousands of migrant woodcock are killed each year when they, under certain conditions, congregate at the end of the Cape May Peninsula. This outrageous slaughter will continue unless steps are taken by State or Federal authorities to check it. If it were possible to establish Cape May Point as a sanctuary the slaughter of both woodcock and hawks could be stopped or if Federal wardens could be on duty there at the time of the flights the illegal shooting which is responsible for most of the killing and which is now unrestrained could be halted."

Nature Magazine has already called the attention of its readers to the Cape May death trap that awaits thousands of migrating woodcock when they make their flight southward each autumn to the tune of the echoing guns. The authorities responsible seem indifferent to the situation. May we hope that by some means they may be awakened from their lethargy?

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HELPS AND HINTS

(Continued from page 59)

visit local nurseries from time to time on the lookout for things that may prove useful in your planting.

The lawn at this season should not be cut too closely. By keeping it longer, the grass will shade the soil somewhat and keep the surface from baking. Mow frequently but adjust the cutting blades so they leave the grass about two inches long. If cut often and at regular intervals the clippings may be allowed to lie and add their bit to mulching the surface. A dressing of ammonium sulphate at the rate of five pounds to one thousand square feet will greatly stimulate the lawn and help its color. Apply the ammonium sulphate upon a cloudy day and water in well as crystals left upon the foliage and exposed to the sun will damage the grass. If the soil upon which your lawn was made is poor, a dressing of pulverized peat moss, half an inch deep all over it will work into the surface and improve it materially.

At this season, many gardens must be watered artificially and observation shows that comparatively few amateurs understand the best way to go at it. When you water your garden or lawn, soak it thoroughly, DON'T SPRINKLE. Make sure by experiment that the soil is wet down eight inches to a foot. Then it will not need further water for a week or more. Where watering is not possible, mulch the surface either by applying a covering of lawn clippings, peat moss or similar material or, by constant cultivation, maintaining a dust mulch. A mulch not only conserves moisture but aids in keeping the soil at a more constant temperature. Sweet peas, properly mulched will bloom over a much longer period. Peat moss is ideal for them.

Improperly staking and tying plants in your garden detracts greatly from its artisticness. Heavy, conspicuous stakes with plants bunched and tied in an unnatural manner are quite unnecessary. Light bamboo stakes are available, stained a dull green or even weathered naturally and by using several rather than a single heavy one and tying with raffia, one may maintain a very natural effect. Raffia may be had in green which is even less conspicuous than the natural. Don't neglect tying your plants until they sprawl all over the ground but do it gradually as they develop. Study each plant to get the best effect possible and soon you'll become an expert and your garden will take on a much improved appearance.

It is not too late to make a final sowing of such annuals as Shirley poppies, mignonette, annual gypsophila and annual lupines. These bloom themselves out in a few weeks and succession plantings must be made. As your dahlias develop, pinch out the laterals or side branches, else your blooms

(Continued on page 63)

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See Page 2 for
Photographic Contest

THE HEAVENS CAPTURED

(Continued from page 56)

that are visible to the naked eye in the entire heavens. There are also eighteen additional projectors appearing as spike-like protuberances on the bulbous ends for projecting nebulas, star-clusters and the brightest star, Sirius, which, because of exceptional brightness, has its own individual projector.

There is a limit to the size of the dome, beyond which, for a number of reasons, it is not advisable to go. The most suitable size has been found to be about sixty-five or seventy feet in diameter and the seating capacity of the projection room for that reason varies from about three hundred to four hundred.

Europe has enthusiastically adopted the Planetarium idea and there are now about a score of European cities that have Planetariums, including Berlin, Hamburg, Leipzig, Dresden, Jena, Nuremberg, Hanover, Mannheim, Barmen, Milan, Rome, Vienna, Stuttgart, Stockholm and Moscow. Many of these cities also have astronomical museums or exhibits in the same buildings that house the Planetarium. In some cases a small admission fee is charged on certain days and under such circumstances the building soon pays for itself because the public is enthusiastic in its approval of this modern method of teaching astronomy to the masses, and eager crowds are constantly seeking admission.

In our own country Philadelphia as well as Chicago is to have a Planetarium. Mr. Samuel S. Fels the philanthropist has donated a large sum of money for that purpose and placed an order for an instrument with the Carl Zeiss Company in Jena. The Fels Planetarium will be housed in the new Franklin Memorial and the Franklin Institute Museum and will be in that portion of the building which is devoted to Astronomy. Another Planetarium will be erected in Los Angeles to be ready for the Olympic Games of 1932.

Astronomers appear to be whole-heartedly in favor of the erection of Planetariums in this country because they realize the great value of teaching astronomy to the school-children and general public in this fascinating, impressive and realistic manner. When an astronomical museum is incorporated in the same building and, if possible, moderate-sized telescopes as well, the whole furnishes an ideal method of bringing the thousands of people who so eagerly desire it in touch with the glories of the heavens.

The Harm Dogs Do

Dogs who are allowed to run wild are exceedingly destructive to wild life, and owners who permit their "living off the land" are no friends of conservation, in the opinion of Dan Patton, of Midnapore, Alberta, Canada. He points out in connection with *A Dog's Day,* by Paul Griswold Howes, that a dog who "comes in with feathers on her nose has undoubtedly caught a mother bird trying to protect her nest or defend her young, and that the infants would subsequently perish from lack of food." "Any dog that would catch and eat a woodchuck would also eat a young lamb. Or if they were in a big game country what chance would a young fawn a few days old have with a pair of dogs like these?" Mr. Patton writes, laying the responsibility for such destruction at the door of the owner.

A Dog's Day was an interesting study of a dog's personality, in the opinion of the editors, and was presented with no attempt either to indicate a moral or exalt such doggy actions as occurred in the tale. We have always felt that dogs are nearly as destructive as cats, and that owners should sufficiently feed their animals so they would not want to hunt. Some dogs will, however, hunt whether fed at home or not, and it is difficult to stop them. Many owners, after reading of what their dogs do when unwatched, will, we feel, be more careful to restrain them.

A Correction

In our June issue we reviewed the excellent pamphlet entitled *Bird Houses, How to Make and Where to Place Them,* written and illustrated by Edmund J. Sawyer and sold for twenty cents by the Cranbook Institute of Science, Bloomfield Hills, Michigan. The error was that we placed Bloomfield Hills in Massachusetts and we regret having put some of our readers to the trouble of research to find out the proper address. We repeat that this is an excellent and practical booklet.

Kellogg Sanctuary

The well-known Kellogg Bird Sanctuary at Wintergreen Lake, near Battle Creek, Michigan, has been deeded to Michigan State College School of Agriculture, and W. K. Kellogg, its founder, has begun another one near his Arabian Horse Ranch near Pomona, California, putting in charge George H. Corsan, Sr., director of the older sanctuary. The Wintergreen Lake refuge has been one of the show places in Michigan during the past several years. Thousands of wild ducks, many geese and scores of whistler swans stop there on migration, and royal swans, trumpeters, whooping cranes and other rare birds may be seen. Nut and fruit trees have been set out around the lake, and food plants planted in it. The sanctuary has been open to the public.

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HELPS AND HINTS

(Continued from page 61)

will be numerous but small and inferior. Permit just a few main stems to develop and your blooms will be much better quality. Delphinium should be cut back to within a few inches of the ground when the first crop of bloom fades and before they form seed. This will insure a second crop of blooms provided you cultivate thoroughly and dress them with steamed bone meal. See that they receive plenty of water and within a few weeks you will be rewarded with a show color which, though it may not be of a quality equal to the first glorious display, will be most welcome. Pyrethrum, like many other perennials, will respond with a second display of bloom if cut back before their first crop of flowers mature. They may also be divided at this time and each division will develop into a blooming size plant by spring.

Pruning climbing roses has generally been advised for this time of the year. We have been told to cut out the old wood as soon as the blossoms fade. With the increasing use of climbers of a type such as Dr. W. Van Fleet, Mary Lovett, Mme. Gregoire Staechelin and Jacotte, we must revise our practice and with these large flowered varieties prune only sufficiently to remove dead wood and surplus growth. Climbers of the rambler type, producing their blooms in clusters, must be pruned annually, removing at the base, the wood that has bloomed, permitting all the strength of the plant to go into the new growth just starting from the base which will be the blooming wood next year.

The rust or blight that plays such havoc with delphinium, phlox, aconitum, Shasta daisies and snapdragons can be controlled by repeated spraying with bordeaux. The damage is done by a fungus usually attacking the under sides of the leaves. Inefficient or careless spraying that fails to reach all leaf and stem surface does little or no good. Also it is necessary that the spraying be repeated at regular intervals of about ten days. Plant lice, so prevalent upon the new growth of shrubs and perennials are controlled by spraying with some of the nicotine solutions. They are killed by actual contact of the spray and efficient work usually calls for three sprayings a day or two apart and care must be used actually to reach every insect. A few stray ones escaping will quickly repopulate.

No matter how old your garden may be or how diligently you have worked at it, never should you be satisfied. Always study where and how you can improve the plantings or the plan. Don't hesitate to discard an inhabitant of your garden when there is something better available. As you discover new and better varieties, study how they may be utilized to the best advantage in your garden. As you recognize defects in your garden plan, study how they may be remedied.

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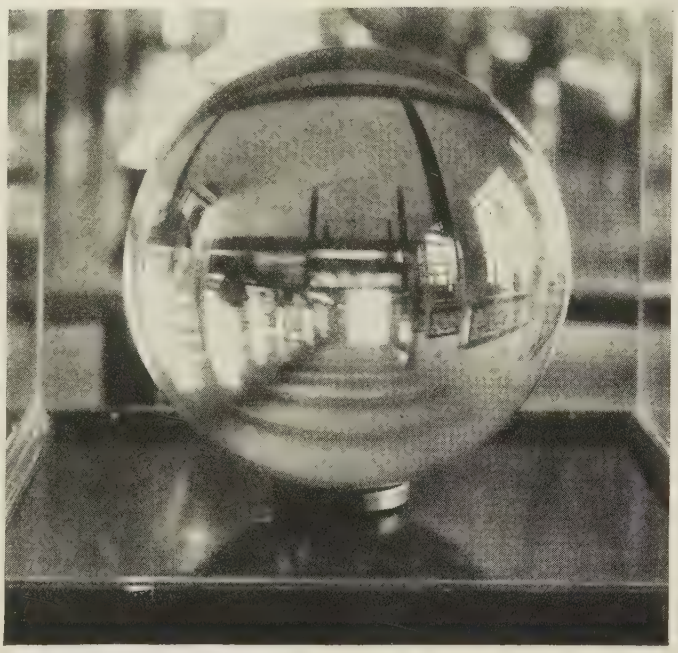

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IN The United States National Museum is a crystal ball that probably exceeds in size and value any known to crystal gazers of ancient or modern times. Not, of course, for any virtue as a means of divining the secrets of the past, present, or future do the sober scientists of the Smithsonian Institution treasure this polished sphere, but because such a work of art requires a piece of quartz crystal of unparalleled size and perfection, which must be reduced to a perfect sphere by months of careful work by trained experts. The block of rock crystal from which this treasured ball was formed was found in Burma, and is said to have weighed more than half a ton in the rough. It was cut in China, and received its final polishing in Japan, whence it was brought to this country by the late Worcester Reed Warner, who deposited it in the Smithsonian collection several years ago. On the death of Mr. Warner, his widow presented the unique object to the Museum, where it is now on exhibition.

The ball, as it now rests in its case, measures twelve and seven-eighths inches in diameter and weighs nearly 107 pounds. Its nearest rival is believed to be a sphere ten inches in diameter belonging to the collection of the University of Pennsylvania in Philadelphia. The value of these large examples of the lapidary's skill is problematical, and involves consideration of several factors—size, relative freedom from flaws, and quality of workmanship. One nearly perfect specimen, faultless both in its material and construction, and measuring slightly more than six inches in diameter, has been valued at twenty thousand dollars. Another, six and two-thirds inches in thickness, almost exactly half that of the Warner specimen, and now in the Green Vaults in Dresden, brought ten thousand dollars as long ago as 1780, a considerable sum in those days. Those who have studied the matter estimate that, making due allowance for the difficulties of finding a piece of quartz of the requisite size and purity, and for the amount of skill and patient labor necessary to finish it, the crystal ball in the National Museum is worth more than a quarter of a million dollars.

The Japanese people excel all others in their love and appreciation of rock crystals. In ancient times the less beautiful ones were believed to be the frozen breath of the White Dragon, and the more brilliant ones the saliva of the Violet Dragon. As the Dragon to the Japanese typified the highest of creations, this indicates their esteem and reverence for the rock crystal. It is to the Nipponese the perfect jewel, a symbol of purity, infinity of space, patience, and perseverance. It is only natural, therefore, that their workmen should excel in the art of cutting and polishing the crystal.

Crystal balls have for time immemorial played a part in attempts at divination. Some of the earliest attempts to look into the future involved the use of objects with bright surfaces, such as mirrors or cups of polished metal. In the story of Joseph and his brethren, as related in Genesis, we learn that Joseph concealed a silver cup in the sack of grain taken away by Benjamin, and invoked its help in seeking the return of his brother. "Is not this it in which my lord drinketh, and whereby he indeed divineth?" In later times the Arabs used a golden ball, incrusted with jewels, that when spun helped the magician to fall into a trance and to see visions. A god of the ancient Mexicans could learn all secrets by means of his mirror. By the thirteenth and fourteenth centuries the Persians and even the Britons were using the crystal ball more or less seriously as a medium for foretelling coming events, and there exists evidence that even the Church sought to derive help from its supposed powers. The operatic stage also celebrates the virtues of the polished sphere. Mephistopheles directs Faust to have prepared a glass, which must be paid for, and which, after certain intricate preliminaries had been observed, would reveal to him anything he wished to know.

Another use of valuable examples of the lapidary's art (perhaps it was merely a means of safe keeping) was discovered in Rome near the close of the sixteenth

THE LARGEST CRYSTAL BALL

century. In making repairs to an old house just outside the city limits, the owners gave orders to break up and remove two large stones that were in the way. On breaking up the mass the workmen were astonished to find, embedded in a cavity that had been hollowed out where the stones were joined, a funeral urn of alabaster. Inside it, and mingled with the ashes, were a number of trinkets of gold and ivory, and about twenty crystal balls. Let us hope that these had already performed their mission, for we are not informed concerning the final place of deposit either of the treasure or of the remains so rudely disturbed. The sepulchre of Childeric, discovered in 1653 by a stone mason, is believed to have contained a crystal ball, and the tombs of several of the kings of France, broken into at the time of the French Revolution, yielded a number, some of which are still in existence, if we may believe the records. The burial places of royalty or others of high estate in several other European countries have so often yielded similar relics as to leave no doubt regarding the esteem and veneration that formerly were attached to the crystal sphere.

But must we believe that nothing of value has come from the original and primary use of the crystal ball—crystal gazing? We are told that the subject by persistently looking into the clear depths of the polished sphere suffers a sort of paralysis of the optic nerve, so that the impression from without fails to reach the sensorium, which then responds to the reflex action proceeding from the gazer's own brain. Thus by a sort of glorified introspection people may come to a better understanding of themselves, and may be led to self-improvement. If this actually happens, and we have the solemn assurance of many that such is sometimes the case, who shall deny to the crystal ball its just measure of virtue?

Wife Beats Husband!

Do birds experience jealousy? The answer is obviously in the affirmative if one wishes to read motives into the actions of a female pigeon residing in Ann Arbor, Michigan, which recently chastised her mate. The drubbing was administered, according to the Colon *Express,* because of attentions paid by the male to another female. The mother bird was busy caring for her young on the edge of an apartment house when she saw the father of her family, ostensibly hunting for food, billing and cooing with another bird a few feet away. She immediately assailed him, and so fierce was her onslaught that he had to flee for protection to a nearby tree. The third party in the affair was not even touched. Sometime later the male came back, alone, but the female again drove him away. A few moments later he reappeared, and this time he was allowed to remain. The reasons for the attack and for the apparent reconciliation are hard to understand, unless bird nature and human nature are considered to have elements in common.

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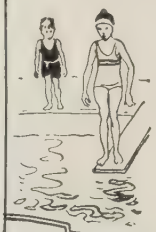

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See page 5

Deer and Beautification

Deer have been frustrating the attempts of the rangers in Glacier National Park to beautify their surroundings, according to George Ruhle, Park Naturalist. Water birches, quaking aspens, mountain maple and other trees were profusely used in landscaping the grounds around the Headquarters last fall, but the deer have used the new growths with their tender leaves for browsing purposes with fatal results to many hopeful groups of saplings. So far, however, they have not injured the graceful Douglas fir planted on the Fourth of July as a memorial to the late Stephen T. Mather, first Director of the National Park Service, but they have discouraged somewhat the eager landscapers by their lack of appreciation of the aesthetic.

Nature Poem Contest

The annual Nature Poem Contest, conducted by the Chattanooga, Tennessee, Writers' Club, opened May 1 and will close November 1, the committee in charge announces. The contest was established by Robert Sparks Walker, well-known Nature writer, in memory of his wife, and is for the Alberta Clark Walker Memorial Prize. All poems must be original and unpublished, but are unrestricted in form and style. They must not exceed 72 lines in length. Miss Blanche Goodman Eisendrath, 710 East Fourth Street, Chattanooga, Tennessee, will supply further details or receive manuscripts.

Memorial Trees

In the natural theatre in back of Buena Vista cottage, on the outskirts of Hazelhurst, Illinois, are growing three pines, in the full bloom of their youth. They stand as memorials for three Nature-loving spirits in whose honor they were planted by the Prairie Club of Chicago, Illinois, last year: Stephen T. Mather, and Ida MacLean and George Brown, former members of the Prairie Club. The first of the memorial plantings by this conservation group, they are now flanked by smaller spruce trees dedicated to each President of the Club and bearing their names. This memorial grove will grow during the years, both in size and significance, as the memory of those for whom it was begun becomes more enduring. Other clubs may wish to follow this worth-while example.

Swedish Botanist Passes

Erik L. Ekman, one of the most distinguished botanists Sweden has produced, recently died in Haiti, where he had been working in plant research for the past seven years. He had devoted the last seventeen years of his life to botanical exploring in the West Indies, and had sent the Swedish State Museum of Science about one hundred thousand valuable species of plants. Ekman, while living in Cuba and Haiti, lived and dressed like a native, and became an intimate friend of the original inhabitants of the islands. He could speak all the dialects and had remarkable influence in both his homes. Though his work highly enriched the science of botany and was of unusual value to his country, Ekman was forced to live on fellowships amounting to less than 2,000 kronor, which in U. S. currency equals about $536.

Shoshone—Oldest Forest

Shoshone National Forest in northwestern Wyoming, the oldest of the national forests that now aggregate 184,000,000 acres, celebrated its fortieth birthday in March. It was originally set apart as a public reservation called the Yellowstone Park Timber Reserve, and embraced 1,239,040 acres. Today it furnishes summer range for 11,000 cattle and horses and 91,000 sheep, and supports about 3,000 elk, 3,900 mule deer, 400 antelope, 200 moose, and 900 mountain sheep. J. N. Langworthy is the present supervisor.

Last Heath Hen Banded

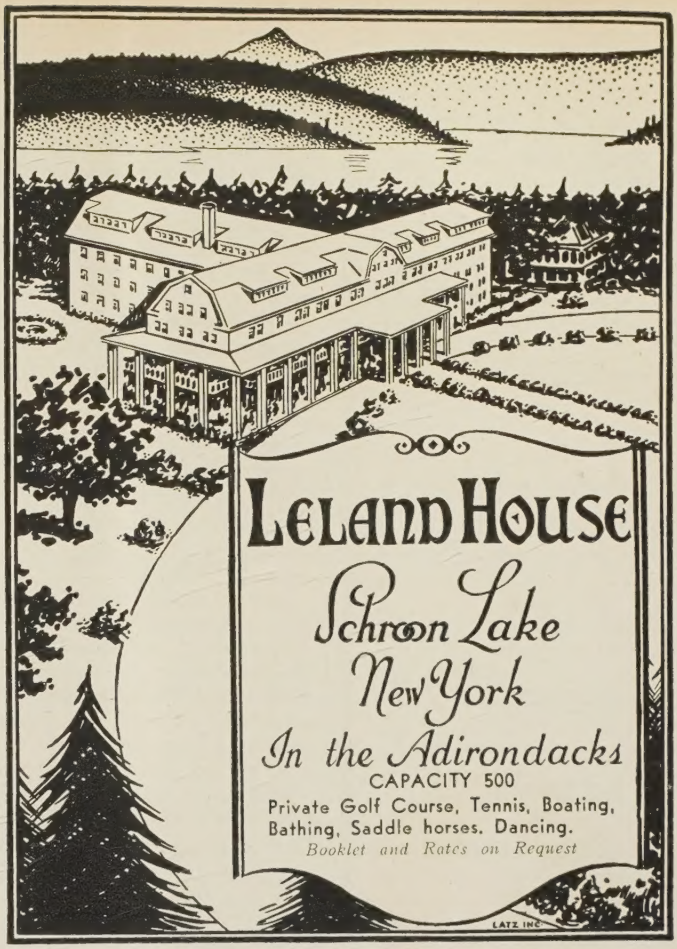
The last heath hen was captured, banded and released on April 1 when he came to the traditional "booming field" on the farm of James Green, near West Tisbury, Martha's Vineyard, Massachusetts, to go through the customary courting ceremony of his kind. He was in perfect health, according to Alfred O. Gross of Bowdoin College, who effected the capture, and may live many more years, barring accidents. Dr. Gross believes that he is about seven years old. The bird has been the solitary representative of his race since December 8, 1928, but for the last three springs has come to the open grasslands to perform weirdly in the manner of his kind; yet no mate has responded. He was caught this year in an iron frame covered with fish seine netting on a lure of grain, and many photographs and moving pictures were taken. This bird is not the last of the species, for the heath hen is the eastern representative of the prairie chicken, from which it differs only slightly in color. Yet the bird just tagged is the last individual of a race that once was common in the eastern states down to New Jersey and Pennsylvania and that might still be abundant but for encroaching settlement and overshooting. Its fate serves as a pitiful example of faulty conservation measures.

Yosian Naturalists

Within the Yosian Brotherhood, the Nature organization founded by J. Otis Swift, Nature writer for the New York *World* and now with the *World-Telegram*, is a close-knit group called the Yosian Naturalists. It has been in existence since 1929, and is headed at present by Al Friedland, Nature writer and teacher at a large boys' camp. This group, which numbers about 100 trained Nature students, has weekly hikes about New York and Westchester Counties, and conducted this spring a series of indoor lectures on Nature subjects. The other officers are: vice-president, Fred Schoenfeld, and secretaries, William Rhein and Mildred Gruskin.

Woods Fire Club

"Fire! Fire!" The words were no sooner uttered than an old truck filled with boys dashed out on the highway. And in less time than it takes to tell about it, they were on the fire, smothering it with branches, raking the burning leaves to places where they could do no harm. Soon the blaze that threatened was nothing but a darkened spot in the grass, and the Lake Jovita Fire Club had cut another notch in its gun. This club, formed of youngsters from fifteen years up, has its headquarters at Lake Jovita, Florida, in the heart of the pinelands, and aims to "combat the evil of the woods burning that is destroying timber, range grasses, hunting and fishing as well as the beauty of the piney woods." It had ten fires to its credit in 1930, and plans, in addition to its main purpose, to restock streams and lakes and protect wild life. Such an organization deserves much credit, and serves as a worthwhile example for other boys' groups to follow.



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Houston Club Bulletin

The active Nature Club of Houston, Texas, has undertaken the task of issuing periodically a Nature bulletin which deals with news of the club and interesting Nature features of Houston and the state at large. It is edited by J. M. Heiser, Jr., the corresponding secretary, and is indeed worthy of a place among the more attractive and valuable publications of Nature organizations. The first issue describes the spoonbill colony on Vingtune Island, the movement to save the big trees of Texas, and the conservation situation at San Jacinto, and in addition contains news notes, editorials and a statement of the purposes of the club. Such a publication is most valuable, and the American Nature Association wishes it continued success.

Memorial to Mrs. Zerbee

Major Leigh Zerbee, U. S. A., has endowed an aquarium section in the Reptile House recently established in the National Zoological Park, in memory of his wife, Frances Brinckle Zerbee. Mrs. Zerbee was a great lover of wild life, and will be remembered by our readers as the author of an article on aquarium management.

The income from the endowment will be used to keep supplied with living specimens this interesting part of our National exhibit.

N. E. A. Meets

The National Education Association will hold its summer convention in Los Angeles beginning June 29, and a feature of the program will be the meetings of the Department of Science Instruction, of which Ralph K. Watkins, associate professor of education of the University of Missouri, is president. A series of lectures will take place on June 29, and on June 30 there will be a symposium on various phases of Nature Study, presided over by Charles Lincoln Edwards, supervisor of Nature Study of the public schools of Los Angeles, who is secretary to the Department.

Large Tree-Plantings

More than 21,000 acres were planted to trees in the national forests during 1930, the U. S. Forest Service announces, and about 25,000 acres, or approximately five times as much land as was planted in 1921, will be the goal for 1931. The greatness of the task ahead of the Forest Service may be seen, however, from the fact that in the states of Washington and Oregon alone, 230,000 acres of national forest lands need re-foresting.

U. S. Gets Foreign Plants

A large herbarium of dried Himalayan plants and seeds was recently given the Bureau of Foreign Seed and Plant Introduction of the Department of Agriculture by Ursuvati, the Himalayan Research Institute of the Roerich Museum, in the Kulu Valley, India. The collection was made by Dr. Walter Koelz, formerly of the University of Michigan. The plants were collected chiefly in Lahul, at an altitude of 13,000 feet, and in the vicinity of Kulu.

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PRESIDENT HOOVER PLANTS HIS BICENTENNIAL TREE

• • •

NATION'S CHIEF JOINS THE TREE-PLANTING ARMY BY PLACING AMERICAN ELM IN GROUNDS OF THE WHITE HOUSE

• • •

PRESIDENT HOOVER has joined the tree-planting army by placing an American Elm in the grounds of the White House to mark the bicentennial, in 1932, of the birth of George Washington. The tree, to be dedicated during the bicentennial year, will have almost a year to become accustomed to its environment.

The president was presented with a certificate of membership in the American Tree Association by Percival S. Ridsdale, the secretary, after a new spade had been handed to him by Russell T. Edwards, director of the educational section. The certificate is similar to those being sent out by the association to the thousands of tree planters which it is registering on its national honor roll.

President Hoover came out of the White House at two o'clock on April 21 and walked rapidly across the lawn on the Pennsylvania Avenue front. He was accompanied by Mr. Richey and Mr. Joslin, his secretaries, as well as his naval and military aides. He smiled as he took the new spade and rapidly began covering the roots of the tree with earth. The photographers called for action again when the president stopped a moment to contemplate what he had done. Still smiling, he shoveled more earth about the tree while dozens of amateur photographers among the hundreds along the sidewalks tried their hand at getting pictures.

"This presidential tree will inspire the planting of thousands of others," said Charles Lathrop Pack, president of the American Tree Association. "It has been listed in the Hall of Fame for Trees with a History. Not far from it stand trees planted by President Roosevelt, President Wilson, President McKinley, and President Hayes. It was a very gracious thing for President Hoover to do. This planting will further attract the attention of the public not only to the bicentennial program but to tree planting throughout the country. The American Tree Association is proud to list the First Citizen on the honor roll of tree planters.

"By May 1 the Association had issued certificates for more than a million, two hundred thousand trees which had been planted and registered on its national honor roll. In the American Tree Association there are no dues and the only way to join is to plant the trees and register them. To every tree planter is sent a certificate which says that as a good citizen having planted a tree, the tree planter has been listed on the national honor roll."

Two unusual marks are announced by the American Tree Association for the tree planters of the country to aim at. Of the thousands of tree plantings reported, what was done in the State of Wyoming, and what was done in Ocean County, New Jersey, will serve as patterns for the rest of the country.

Charles A. Morris, Ocean County Superintendent of Schools, C. M. Bair, Lakewood Superintendent of Schools, and William H. Savage of Lakewood, New Jersey, directed efforts resulting in George Washington bicentennial trees having been planted on every piece of school property in Ocean County. This establishes the first complete county school planting in the United States. The Ocean County planting centered at Lakewood where more than 2,500 trees were planted. One magnificent tree was the gift to the high school by John D. Rockefeller. Civic organizations, the Scouts and patriotic societies, had part in this program. After the Lakewood planting three trucks loaded with trees started through the county and tree planting continued for three days.

The Wyoming Commission for the celebration of the Two Hundredth Anniversary of the Birth of George Washington reports through George E. Brimmer, the chairman, that a George Washington Memorial Park will be created in each one of the municipalities in the state, and that the Commission considers this the most fitting method of celebrating the birth of Washington.

The Commission outlines the great work that has been done in tree planting by Brigadier General Charles H. Howland at Fort Francis E. Warren, where a memorial avenue of three and a half miles has been planted with trees. The Commission suggests that it would be a fine thing if a Washington Memorial Park could be created in each Military post in the United States. Governor A. M. Clark is keenly interested in the Wyoming program and Dr. A. C. Hildreth of the Executive Committee and head of the Cheyenne Horticultural Field Station has done a great deal of work on the preliminary plans.

Schools everywhere are planting Washington bicentennial trees. The Indiana School for the Blind registered forty trees through George S. Wilson, the superintendent. Another registration came from the Upper Cut Meat Day School at Rosebud Indian Agency. The Cherokee Indian School in North Carolina is also on the honor roll. Registrations from Hawaii have been made. The Women's Clubs in Alaska have a program under way. At Red Oak, Iowa, a new school was named for Washington and one thousand trees planted.

Trinity College at Hartford, Connecticut, has planned for planting 1,100 trees in a school grove to be planted in honor of George Washington, according to a report by R. B. Ogilby, president of the college. According to a report sent in by Marcine Edwards, of Mount Union College at Alliance, Ohio, the sororities and fraternities as well as the president of the College have all planted memorial trees for George Washington.

The Lions Club of Washington, Kansas, sponsored the distribution and planting of 300 trees according to L. E. Sawin, chairman of the tree-planting committee. The Lions Club of Frederick, Maryland, has planted 35 trees according to a report by H. C. Gubisch, secretary of the club.

The Young Men's Division of the Association of Commerce of Decatur, Illinois, has planted 10,000 so R. B. McClelland, the assistant secretary, stated.

The St. Paul Area Council of the Boy Scouts of America has planted 675 trees in honor of George Washington, the report being made by Harry Bartelt, the assistant Scout Executive.

The General John J. Pershing National Military Park Association of Laclede, Missouri, had planted a tree in honor of George Washington and the association is sponsoring the tree-planting plan in the city. The public schools, the Methodist Church and the Masonic Lodge have joined in the planting project.

Tree planters all is the aim of the American Tree Association. It is not too early to make plans for Fall planting. Every community should be in line on this bicentennial memorial. Send for the tree-planting suggestions and get tree-planting plans under way as early as possible.

This call is to those who have the vision to look ahead a hundred years. The "grandchild" of the Cambridge Elm sent to Sulgrave Manor in England has been planted since the June issue of NATURE MAGAZINE. Picture what that tree will be like in a hundred years; then picture the possibilities of the tree that you plant in memory of Washington.

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